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Critical success factors influencing project success in the construction industry

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Abstract

The construction industry is one of the largest job creators in developing countries and is highly competitive. The high number of project failures suggests the existence of underlying critical success factors which have not been identified. This article assesses the perceptions of contractors and project managers on the critical success factors that lead to project success in the construction industry. This article is based on the four COMs model (comfort, competence, communication and commitment). A survey was conducted among 95 project managers and 61 active grade four contractors in Durban, South Africa. The findings reveal that both project managers and contractors strongly support the identified critical success factors as significant in achieving project success. There was no significant difference in their perception of critical success factors, based on the biographic characteristics. The recommendations presented may be used as a guideline for successful execution of construction projects.

Keywords: Critical success factors, project success

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Abstrak

Die konstruksiebedryf is een van die grootste werkskeppers in ontwikkelende lande en is hoogs mededingend. Die hoë aantal projekmislukings dui op die bestaan van onderliggende kritiese suksesfaktore wat nog nie geïdentifiseer is nie. Hierdie artikel poog om waarnemings wat kontrakteurs en projekbestuurders van die kritiese suksesfaktore in die konstruksiebedryf gemaak het, te bepaal. Die vier COMs-model (*comfort, competence, communication* en *commitment*) is gebruik om as basis vir hierdie studie te dien. Die opname is gedoen onder 95 projekbestuurders en 61 aktiewe graad-vier kontrakteurs, in Durban, Suid-Afrika. Die bevindinge het getoon dat beide projekbestuurders en kontrakteurs die kritiese suksesfaktore betekenisvol vind en sterk ondersteun, om projek sukses te bereik. Daar was geen betekenisvolle verskil in hul waarneming van kritiese suksesfaktore gebaseer op die biografiese kenmerke nie. Die aanbevelings wat gemaak word, kan as riglyn vir die suksesvolle uitvoering van konstruksieprojekte gebruik word.

Sleutelwoorde: Kritiese suksesfaktore, projeksukses

1. Introduction

Project success has eluded the construction industry to the point where keeping existing clients has become a battle, let alone attracting new clients (Toor & Ogunlana, 2005: 150). An assumption is made that, if a project is completed on time, within the agreed budget and set quality, referred to as the 'golden triangle', then the project is deemed successful. Evidence suggests that this is far from the truth. Hence, the construction industry needs to pay special attention to critical success factors, besides the 'golden triangle', if it is to survive the challenges posed by globalisation (Toor & Ogunlana, 2005: 154).

Zwikael (2009: 381) believes that the work of construction companies is project-oriented, i.e., it is unique and has a definite start and finish point. This requires the use of project management tools and techniques as opposed to conventional management techniques. Proper usage of project management tools within the project life cycle ensures smooth execution of activities. The project life cycle is the framework upon which the project is carried out. The project manager acts as a single point of contact responsible for harnessing identified critical success factors towards achieving project success. According to Yang, Shen & Ho (2009: 162), the unique nature of projects dictates that critical success factors identified in one industry cannot be directly transferred to other industries. The similarities found in the construction industry in developing countries such as South Africa make sharing of knowledge easier.

The construction industry is one of the largest job creators in developing countries and has become highly competitive with

the advent of globalisation (Nguyen, Ogunlana & Lan, 2004: 409). Contractors, consultants and project managers in South Africa are finding it increasingly difficult to attract new clients. In addition, it is not clear as to what actions need to be taken in order to improve project success. According to Ojiako, Johansen & Greenwood (2008: 414), project success in the construction industry in South Africa and in most developing countries is measured by the 'golden triangle' parameters of time, cost and quality. The high number of project failures suggests the existence of underlying critical success factors which have not been identified. This article, therefore, seeks to identify the critical factors that lead to project success.

Achieving project success is becoming more important in the highly competitive construction industry. Large and complex construction projects are becoming more difficult to complete successfully in developing countries (Swan & Khalfan, 2007: 123). It is against this background that this article focuses on critical success factors pertaining to the construction industry in Durban, South Africa. Han, Yusof, Ismail & Choon (2012: 90) advocate the suitability of the 4 COMs model proposed by Nguyen, Ogunlana & Lan, which is considered suitable for application in emerging economies. The aim of this article is to assess the perceptions of contractors and project managers regarding critical success factors which lead to project success in the construction industry in Durban, South Africa.

2. The four COMs

Critical success factors are those inputs to the project management system that directly increase the likelihood of achieving project success. Nguyen, Ogunlana & Lan (2004: 404-413) identify and group success factors under four categories which are referred to as the 'four COMs', viz., comfort, competence, commitment and communication.

2.1 Comfort

The comfort component emphasises that successful projects include the involvement of stakeholders. This includes both primary stakeholders who have a legal relationship to the project (e.g., subcontractors) and secondary stakeholders who do not form a direct part of the project, but influence decisions (e.g., community forums). The needs of stakeholders have to be managed and influenced in a manner that ensures project success (Swan & Kalfan, 2007: 120). It is essential that a competent project manager be appointed. Malach-Pines, Dvir & Sadech (2009: 284) believe that

such an individual should possess both technical skills, which include being a subject matter expert and having an in-depth knowledge of structures, and “soft” skills, which include team management, emotional intelligence, transformational leadership and conflict management. According to Newton (2005: 110), the availability of resources is a further critical factor. A resource management plan needs to be developed in conjunction with all relevant stakeholders. Competition for resources is a common phenomenon in projects. Unexpected developments during the course of the project must be carefully managed in terms of resource planning. It must be ensured that there is adequate funding throughout the project. A financial plan, which takes into account the project activity schedule, needs to be developed. Finally, there must be comprehensive contract documentation. It must be ensured that all relevant stakeholders enter into contractual agreements regarding activities and performance during the course of the project. Cost, time and quality parameters need to be specified so that performance can be assessed (Johnson, Scholes & Wittington, 2006: 826).

2.2 Competence

The competence component identifies the following four aspects as being central to successful project management in the construction industry. First, utilisation of up-to-date technology. Nguyen, Ogunlana & Lan (2004: 411) believe that adopting new technology and utilising it to its full potential has become critical in achieving a competitive advantage in the construction industry. The construction industry has witnessed significant technological developments in recent years. Selecting the appropriate new technology and optimal utilisation is key to project success. Secondly, there must be proper emphasis on past experience. According to Pathirage, Amaratunga & Haigh (2007: 117), tacit knowledge plays a key role in this regard. In addition, project members should be encouraged to document tacit knowledge gained from the project in order to prevent mistakes in subsequent projects. Thirdly, there must be competent teams in place, implying that staff members must have the necessary skills (Melkonian & Picq, 2010: 82). This requires a comprehensive skills analysis that should reveal gaps in skills. Finally, the aspect of awarding bids to the right project manager/contractor needs consideration. The construction industry in South Africa has witnessed an increase in the number of contractors, resulting in more intensive competition in this sector. The Black Economic Empowerment (BEE) status of a contractor plays a key role in the selection of contractors, especially in the case of public sector projects. Other considerations

when selecting contractors include company track record, quality management, health and safety, and technical proficiency (Philips, Martin, Dainty & Price, 2008: 312).

2.3 Commitment

Commitment emphasises the support of top management, commitment to the project, clear objectives and scope, and political support. The support of top management goes beyond the provision of funds and making resources available (Johnson, Scholes & Wittington, 2006: 504). Kerzner (2006: 200) believes that commitment to the project is very closely linked to a sense of collectivism, rather than individualism. An environment needs to be created, in which team members experience job satisfaction and are, therefore, motivated to be part of the team. Optimal performance by team members is important. Having clear objectives and scope are key in providing direction to team members. Objectives must be clear and scope should be as simple as possible in order to avoid "grey areas". It is inevitable that changes will occur during the course of the project. Flexibility and adaptability are, therefore, central to achieving success. Finally, political support is important for project success, given that a large proportion of projects are public projects. To this end, support from non-governmental organisations and the ruling party is important (Jacobson & Choi, 2008: 646).

2.4 Communication

Communication plays an important role in leading, integrating people, and taking decisions to make a project a success. There must be shared project vision, where the project manager identifies the interests of all relevant stakeholders and ensures that there is buy-in to the project (Yang, Shen & Ho, 2009: 166). According to Zwikael (2009: 385), once the project objectives are set and the scope clarified, there must be constant update as the project progresses. Progress on activities assigned to individuals or groups needs to be monitored with a view to achieving overall goals. These updates must be communicated to the relevant parties. Newton (2005: 38) believes that a detailed communication plan is necessary for the effective dissemination of information. To this end, frequent project meetings are necessary. Apart from consulting with the community, local direct involvement is a key element for project success. Given the relatively high unemployment rates in South Africa, consideration must be given to local residents. This could include sourcing materials from local suppliers and employing local residents. It is advisable to use an influential community member as a

liaison between the project manager and the community (Teo, 2010: 222). Finally, proper handover procedures need to be developed. This is an important consideration, given that the construction industry is being increasingly viewed as a service industry (Karna, Junnon & Sorvala, 2009: 117).

3. Research methodology

Being a quantitative study, the survey method was used to gather primary data (Easterby-Smith, Thorpe & Jackson, 2008: 11). The study is descriptive and cross-sectional in nature. The study was confined to commercial projects, hence excluding residential construction. There were two target populations, namely project managers and contractors who worked on both private and public sector projects. Project managers comprised independent professional practitioners who are principal agents that were the interface between the client and the contractor. The contractors were those parties who did the actual construction work. For the purpose of this study, only active contractors classified as Construction Industry Development Board (CIDB) grade 4 were selected. Population details of contractors were obtained from the CIDB register which indicated the population size of active grade 4 contractors as 68 within the greater Durban area (Register of Contractors, 2010). Population details in respect of project managers were obtained from the South African Council for Project and Construction Management Professions, which indicated a population size of 101 for the Durban area. An attempted census was conducted owing to the relatively small population sizes. According to Brown & Suter (2008: 113), a census is a type of sampling plan where data is collected from every member of a population. Questionnaires were, therefore, personally administered, by both the researcher, as well as through the employment of graduate assistants, to 101 project managers and 68 contractors. Ninety-five project managers and 61 contractors responded, constituting a response rate of 95% and 90%, respectively.

The questionnaire was divided into two sections, namely a biographical section and a section relating to critical success factors. The biographical section was included in order to test for significant differences between the selected biographical factors and perceptions of critical success factors. The section relating to critical success factors consisted of 18 questions with five questions pertaining to "comfort", four questions addressing "competence", four questions pertaining to "commitment", and five questions addressing "communication". These comprised

closed-ended questions using a five-point scale (not important – extremely important, where 1 indicates not important and 5, extremely important). Closed-ended questions were preferred, as they reduce the respondent's bias and facilitate coding of the questionnaire (Akintoye & Main, 2007: 597-617). Respondents were given the opportunity to make relevant comments at the end of the questionnaire. Descriptive and inferential statistics were used to analyse the quantitative data. The data analysis was performed using the Statistical Package for Social Sciences (SPSS). The level of significance was set at 95% ($p=0.05$).

4. Findings and discussion

4.1 Biographical data

The results, indicated in Table 1, show that the vast majority of respondents were male, with 80% of project managers and 79% of contractors being male, clearly indicating the dominance of males in the sector. The largest proportion of respondents for both project managers and contractors was in the 40-59 age group (47.4% of project managers and 45.9% of contractors). Interestingly, 18.9% of project managers and 29.5% of contractors were over 60 years of age. This suggests a need for capacity replacement in the long term, as the latter group is expected to retire in a few years' time. All the respondents have over five years' experience in the industry, with 74.7% of project managers and 60.7% of contractors having over 10 years' experience in the industry. This can be attributed to the fact that it takes a significant number of years to gain enough experience and a good reputation which would enable one to do consulting or undertake challenging projects.

A total of 80.3% of the contractors were employed in the public sector, as compared to 67.4% of the project managers being employed in the public sector, indicating a relatively small proportion of respondents being employed in the private sector. This is mainly due to the fact that South Africa is a developing country, and the public sector offers most of the tender-based projects. Ideally, the private sector should be awarding a larger number of tenders to the industry which, in turn, would create more employment opportunities.

Table 1: Biographical details of respondents

<i>Respondents</i>	<i>Project managers</i> N=95	<i>Contractors</i> N=61
Gender		
Male	80.0	78.7
Female	20.0	21.3
Total	100.0	100.0
Age		
20-39	33.7	24.6
40-59	47.4	45.9
60+	18.9	29.5
Total	100.0	100.0
Years in industry		
Less than 5 years	0	0
5-10 years	25.3	39.3
Over 10 years	74.7	60.7
Total	100.0	100.0
Industry sector		
Public	67.4	80.3
Private	32.6	19.7
Total	100.0	100.0

4.2 Findings and discussion on the 'four COMs'

The following is a descriptive account of respondents' opinions on the importance of the elements that constitute the '4 COMs'

4.2.1 Comfort

The frequency distributions of items relating to comfort, in respect of project managers, as indicated in Table 2, reveal that all respondents were in agreement that the items that constituted comfort were important, with a minimum of 80% of project managers considering the items that constituted comfort as being 'extremely important'. Having comprehensive contract documentation was ranked the highest, highlighting the importance of having sound contractual arrangements. The findings, as presented in Table 3, indicate that all contractors also considered the items that constituted comfort as being important, with at least 78.7% of contractors considering the items as being 'extremely important'. Contractors, however, ranked the involvement of stakeholders as being the most important item. Interestingly, contractors ranked comprehensive contract information the lowest. Both project managers and contractors ranked the involvement of stakeholders very highly. This suggests

a greater appreciation for consultation with the relevant interest groups. Swan & Khalfan (2007: 120) advise that the inclusion of all stakeholders, including the public, is essential for successful project delivery. Yang, Shen & Ho (2009: 166) believe that the project manager has to identify the interests of all relevant stakeholders and ensure that there is buy-in to the project. Anantatmula (2010: 14) believes that a competent project manager is able to carefully define roles and responsibilities of project team members. According to Newton (2005: 110), a resource plan has to be adequately developed and distributed to every section involved in the project. In addition, Johnson, Scholes & Whittington (2006: 305) stress the importance of adequate funding throughout the project. This will ensure that no activity is hampered, due to funding shortages. The importance of contract documentation is highlighted by Kerzner (2006: 826), who suggests that, if no contract is signed, it would be difficult to ensure performance of the necessary activities.

Table 2: Frequency distribution of factors relating to comfort: Project managers (n=95)

	Items that constituted comfort		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Involvement of stakeholders	%	0	0	0	10.5	89.5	100	4.89	2
2	Competent project manager	%	0	0	0	14.7	85.3	100	4.85	3
3	Availability of resources	%	0	0	0	19.1	80.9	100	4.79	5
4	Adequate funding	%	0	0	0	20.0	80.0	100	4.80	4
5	Comprehensive contract documentation	%	0	0	0	4.2	95.8	100	4.95	1

Table 3: Frequency distribution of factors relating to comfort: Contractors (n=91)

	Items that constituted comfort		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
			1	Involvement of stakeholders	%	0	0			
2	Competent project manager	%	0	0	0	8.2	91.8	100	4.80	3
3	Availability of resources	%	0	0	0	19.7	80.3	100	4.90	2
4	Adequate funding	%	0	0	0	19.7	80.3	100	4.79	5
5	Comprehensive contract documentation	%	0	0	0	21.3	78.7	100	4.79	5

4.2.2 Competence

The frequency distributions of items relating to competence in respect of project managers and contractors are reflected in Tables 4 and 5, respectively. It is evident that the majority of respondents identified the items as being 'extremely important' for the successful management of construction projects. A minimum of 73.7% of project managers and 75.4% of contractors considered the items that constituted competence to be 'extremely important'. Project managers ranked awarding bids to the right project manager/contractor as the most important item, whereas contractors ranked the utilising of up-to-date technology as being the most important. Both project managers and contractors, however, ranked utilising up-to-date technology very highly. On the issue of competence, specifically, utilising technology, Nguyen, Ogunlana & Lan (2004: 411) suggest that the project manager identifies all technology needs during the briefing stage. Chong, Wong & Lam (2006: 912) stress the importance of past experience among project managers with a view to increasing the chances of project success. In addition, tacit knowledge, as an element of past experience, plays a vital role in enhancing organisational performance in achieving competitive advantage in the construction industry (Pathirage, Amaratunga & Haigh, 2007: 117). Competence among teams is a further consideration. According to London, Chen & Bavinton (2005: 301), a comprehensive skills analysis needs to be undertaken to identify skills gaps. These can then be addressed

through the relevant interventions, with a view to having competent teams. Phillips, Martin, Dainty & Price (2008: 308) advocate the use of multiple criteria when selecting contractors. These criteria need to take into consideration, *inter alia*, track record, safety practices, quality management, technical ability, and, in South Africa, Black Economic Empowerment.

Table 4: Frequency distribution of factors relating to competence: Project managers (n=95)

	Items that constituted competence		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Utilising up-to-date technology	%	0	0	0	16.8	83.2	100	4.83	2
2	Proper emphasis on past experience	%	0	0	0	26.3	73.7	100	4.74	4
3	Competent project team	%	0	0	0	17.9	82.1	100	4.74	4
4	Awarding bids to the right project manager/ contractor	%	0	0	0	14.7	85.3	100	4.85	1

Table 5: Frequency distribution of factors relating to competence: Contractors (n=91)

	Items that constituted competence		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Utilising up-to-date technology	%	0	0	0	11.5	88.5	100	4.89	1
2	Proper emphasis on past experience	%	0	0	0	18.0	82.0	100	4.82	2
3	Competent project team	%	0	0	0	24.6	75.4	100	4.75	4
4	Awarding bids to the right project manager/ contractor	%	0	0	0	19.7	80.3	100	4.80	3

4.2.3 Commitment

The frequency distributions of items relating to commitment in respect of project managers, as indicated in Table 6, reveal that the items comprising the commitment dimension were regarded as 'extremely important' in over 80% of the instances. As reflected in Table 7, at least 82% of contractors regarded the items that constitute competence as being 'extremely important'. Thus, the vast majority of respondents identified the commitment dimension as a critical success factor for the successful completion of construction projects. Project managers ranked political support as being the most important factor, whereas the support of top management was considered most important by contractors. Both parties ranked political support very highly, understandably, considering that the majority of projects are based in the public sector. Projects, especially public projects, are influenced by the politics of the day, hence the need for political support. Jacobson & Choi (2008: 646) identify non-governmental organisations and political parties as the key political players. According to Johnson, Scholes & Whittington (2006: 504), projects come about due to a strategic objective that the organisation has to achieve. The support of top management is, therefore, essential. Commitment to the project is vital. Having clear objectives and scope are key elements. Lindahl & Ryd, (2007: 152) believe that project objectives have to be iterated and validated on an ongoing basis. Forsythe (2008: 480) indicates that construction clients make quality judgments progressively throughout the project, hence the need for clear objectives and scope.

Table 6: Frequency distribution of factors relating to commitment: Project managers (n=95)

	Items that constituted commitment		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Top management support	%	0	0	0	20.0	80.0	100	4.80	4
2	Commitment to project	%	0	0	0	19.0	81.0	100	4.81	3
3	Clear objectives	%	0	0	0	11.6	88.4	100	4.88	1
4	Political support	%	0	0	0	14.7	85.3	100	4.88	1

Table 7: Frequency distribution of factors relating to commitment: Contractors (n=91)

	Items that constituted commitment		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Top management support	%	0	0	0	11.5	88.5	100	4.89	1
2	Commitment to project	%	0	0	0	14.8	85.2	100	4.86	3
3	Clear objectives	%	0	0	0	18.0	82.0	100	4.82	4
4	Political support	%	0	0	0	11.5	88.5	100	4.88	2

4.2.4 Communication

It emerged that at least 71.6% of project managers and 78.7% of contractors considered the items that constitute communication to be 'extremely important', once again suggesting that the vast majority of respondents considered communication to be a key success factor in the management of construction projects. These findings are reflected in Tables 8 and 9. Both project managers and contractors agreed that handover procedures were the most important item that constituted communication. This points to the adoption of a more client-orientated approach. With regard to handover procedures, Karna, Junnonen & Sorvala (2009: 117) view the construction industry as increasingly becoming a service industry. This means that industry players have to become more client-orientated, where the emphasis shifts from "working for the client" to "working with the client". With regard to the regular update of project plans, Zwikael (2009: 385) advises that special focus be given to activity definition and project plan development, as these serve as a basis for project plan updates. Newton (2005: 38) suggests that the project manager must communicate, on a regular basis, with the project team, legitimate stakeholders, the client and, where applicable, the project sponsor. Kotler & Keller (2006: 286) support community involvement, as this indirectly enhances the organisation's social responsibility standing.

Table 8: Frequency distribution of factors relating to communication: Project Managers (n=95)

	Items that constituted communication		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Shared project vision	%	0	0	0	28.4	71.6	100	4.72	5
2	Regular update of plans	%	0	0	0	19.0	81.0	100	4.81	3
3	Frequent project meetings	%	0	0	0	11.6	88.4	100	4.88	2
4	Community involvement	%	0	0	0	19.0	81.0	100	4.81	3
5	Handover procedures	%	0	0	0	7.4	92.6	100	4.92	1

Table 9: Frequency distribution of factors relating to communication: Contractors (n=91)

	Items that constituted communication		1=Not important 5=Extremely important					Total	Mean	Ranking
			1	2	3	4	5			
1	Shared project vision	%	0	0	0	14.8	85.2	100	4.85	2
2	Regular update of plans	%	0	0	0	21.3	78.7	100	4.79	5
3	Frequent project meetings	%	0	0	0	18.0	82.0	100	4.82	4
4	Community involvement	%	0	0	0	14.8	85.2	100	4.85	2
5	Handover procedures	%	0	0	0	13.1	86.9	100	4.87	1

4.3 Relationship between biographical variables and opinions on critical success factors

The Mann-Whitney test, based on the responses of the 95 project managers and 61 contractors was used to compare the mean scores across the four dimensions at the 95% level of significance ($p=0.05$). The results, presented in Table 10, indicate no significant differences between project managers and contractors with regard to their opinions of the four COMs at the 95% level of significance. This finding suggests that the critical success factors were considered

equally important to both industry players, that is, project managers and contractors.

Table 10: Differences between project managers and contractors on opinions of critical success factors

<i>Group</i>	<i>N</i>	<i>Mean</i>	<i>P</i>
Comfort			
Project Manager	95	4.83	
Contractor	61	4.84	0.751
Competence			
Project Manager	95	4.87	
Contractor	61	4.81	0.108
Commitment			
Project Manager	95	4.83	
Contractor	61	4.85	0.263
Communication			
Project Manager	95	4.83	
Contractor	61	4.83	0.974

Furthermore, the results reflected no significant differences between male and female contractors as well as male and female project managers at the 95% level ($p > 0.05$) of their perceptions of the critical success factors.

A Kruskal-Wallis test showed a significant difference only on the communication dimension among the age groupings of project managers ($p < 0.05$). The perception that communication was an important dimension was higher among the 40-59 and over 60 age groups. This could be attributed to these respondents being in the industry for a relatively longer time, hence considering communication to be more important than respondents below the age of 40. The Mann-Whitney test also showed no significant differences between years of service among project managers or contractors and their perceptions of the critical success factors ($p > 0.05$). It could be that, irrespective of tenure, the critical success factors have been identified with no ambiguity by project managers and contractors. In addition, the Mann-Whitney test showed no significant differences between project managers and contractors from the public and private sectors and their perceptions of the critical success factors ($p > 0.05$). Thus, the critical success factors remain relevant for both the public and private sector respondents. Chan, Wong & Lam (2006: 924) suggest that project managers should have past experience in public housing in order to increase

the likelihood of project success. This is, to a large extent, due to the nature of the public sector projects. For example, the nature of stakeholders is more complex than in private sector projects. Public sector projects involve a multitude of stakeholders ranging from the local municipality to the affected community and even political parties with divergent interests. Hence, past experience in the public sector could enhance the likelihood of a project manager achieving success.

When asked to make additional comments which they viewed as critical for the successful completion of projects, a few respondents pointed to misunderstandings arising out of contractual documents, resulting in lawsuits and delays in payment from public sector clients, thus causing cash flow problems.

5. Conclusion

Given the difficulty in defining project success, the four COMs model has been advocated as being a useful tool in assessing project success, especially in developing countries. This article sought to assess the perceptions of project managers and contractors regarding the critical success factors that lead to project success. The findings suggest that both project managers and contractors strongly support the critical success factors identified in the four COMs model as being significant in achieving project success. It emerged that there were no significant differences between project managers and contractors regarding the critical success factors. The findings also show no significant differences between project managers and contractors on the biographical variables of gender, age, tenure in the industry and sector (public and private), and their perceptions of critical success factors.

6. Recommendations

Over and above the 'golden triangle', an enabling environment should be established which will ensure that construction projects are executed in comfort, by competent individuals, with a clear communication plan (including skills) and receive commitment from all relevant stakeholders. Simplification of contracts should be one of the CIDB's key priorities, as this issue has recently resulted in the increase of lawsuits. This has created an atmosphere of mistrust, mainly between project managers and contractors, since, in most instances, contractors do not deal directly with the client.

In order to avoid individualism, which can lead to declining commitment to a project, a clear line of responsibility should be demarcated, e.g., in the form of a linear responsibility chart. Tools such as a work breakdown structure (WBS) should be used to break down activities assignable to specific individuals. It is further recommended that working on several projects simultaneously should be avoided, as this may potentially compromise the quality of the project. The CIDB could institute legislation that allows contractors to work on a certain number of projects at a given interval of time. This legislation will also ensure that projects are evenly spread across contractors. In addition, awarding of bids to the right project manager or contractor in the public sector must be conducted by an independent body which is not aligned to the local authorities or municipalities. Organisations undertaking government work should lobby for more efficient payment processes, especially timeous payment. Delays in payment can place a burden on the liquidity position of operators. Another key issue that needs to be addressed is capacity-planning for the future in respect of project managers. The current situation reflects a dominance of males in the industry. Furthermore, a significant proportion of project managers and contractors are close to retirement age, making it necessary for the appropriate measures to be taken to ensure capacity in the industry in the future.

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