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Data Article

Data exploration on factors that influences construction cost and time performance on construction project sites

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ABSTRACT

This data article explores the factors that contribute to maintaining steady cost projection on construction projects. The data was obtained using structured questionnaire designed in Likert scale. The responses were solicited from category of construction practitioners. Simple random sampling was employed in the distribution of the questionnaires to the respondents. Data samples were analysed using severity index, ranking and simple percentages. The analysis of the data brought to fore some important data on factors that causes cost overrun, they include: contractor's inexperience, inadequate planning, inflation, incessant variation order, and change in project design. They are critical to causing cost overrun, while project complexity, shortening of project period and fraudulent practices are found to be responsible. The data fall within the percentages of possible consequences of cost overrun when compared with those available in scientific literature. The data can provide insights on how to mitigate the risks of project deviation from initial cost and as-built project.

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Specifications Table

| | |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject area | Building Construction |
| More specific sub- ject area | Construction Management |
| Type of data | Table, text file. |
| How data was acquired | Field survey |
| Data format | Raw, filtered and analyzed data |
| Experimental factors | Simple percentages and severity index were used as analytical tool of the generated data. SPSS (Statistical Packages for Social Science Students) was used in determining the nature, strength and pattern of relationships among the cost determinants and variables. The factors were ranked in order of their degree of severity. |
| Experimental features | The key method used in data collection structured questionnaire designed in Likert scale, the questionnaire was designed in such a way that it helps to collate basic information from the respondents. A population size of seventy (70) was selected, and a total sample size of 59 respondents was used in data generation, with questionnaire distributed to construction professionals. Variables pertaining to the above listed targets were identified and incorporated into questionnaires as the primary source of data. The data was collated and analysed, using mean item score ranking, percentages and descriptive statistics. |
| Data source location | Covenant University, Ota, Nigeria |
| Data accessibility | The article is in public repository http://eprints.covenantuniversity.edu.ng/ |

Value of the data

- i. The data is useful in research that involves studying cost performance of construction projects.
- ii. Data presented is useful in studying cost overrun that would help client and professional in project cost planning.
- iii. The data could be used in development of cost and time models.
- iv. The data is valuable to construction project professionals and could be used in policy formulation.
- v. The data could be used as basis of comparison with that of other countries in terms of project management.

1. Data

The data was obtained using structured questionnaire designed in Likert scale. The responses were solicited from category of 70 construction practitioners using survey sampling methodology. The data retrieved from the 70 practitioners are presented as follows: data of professional affiliation of respondents is presented in [Table 1](#), data on years of experience ([Table 2](#)), data on economic sector where they belonged ([Table 3](#)), data on procurement methods used by the respondents ([Table 4](#)) and time data on period of cost overrun experienced by them in executing construction projects ([Table 5](#)).

Furthermore, severity index was used to obtain the ranks of cost-overrun determinants presented in [Table 6](#). The data on impact of cost and time on project performance is shown in [Table 7](#). The cost and time overrun survey information data on residential building projects are shown in [Table 8](#) while the data is in agreement with those available in scientific literature as regards to the consequence of cost overrun.

Table 1
Data profession of respondents.

| Professional cadre of respondents | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Architect | 20 | 29.9 |
| Builders | 15 | 22.4 |
| Engineers | 15 | 22.39 |
| Quantity Surveyor | 10 | 14.9 |
| Estate Surveyor | 10 | 10.45 |
| Total | 70 | 100 |

Table 2
Data on respondents' years of experience.

| Years of experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Above 10yrs | 30 | 42.8 |
| 225-10yrs | 20 | 28.6 |
| 1-5yrs | 17 | 24.3 |
| Missing data | 3 | 4.3 |
| Total | 70 | 100 |

Table 3
Data on economic sector of the respondents.

| Economy Sector | Frequency | Percentage |
|----------------|-----------|------------|
| Private sector | 47 | 67.1 |
| Public sector | 20 | 28.6 |
| Missing data | 3 | 4.3 |
| Total | 70 | 100 |

Table 4
Data of procurement methods used by the respondents.

| Procurement methods | Frequency | Percentage |
|---------------------|-----------|------------|
| Traditional method | 3 | 4.3 |
| Project management | 6 | 8.5 |
| Direct labor | 10 | 14.3 |
| Design and build | 20 | 28.6 |
| Labor only contract | 28 | 40.0 |
| Missing data | 3 | 4.3 |
| Total | 70 | 100 |

Table 5
Data on period of cost overrun experienced on projects.

| No of Years | Frequency | Percentage |
|---------------|-----------|------------|
| Above 2Yrs | 0 | 0.00 |
| 1-2 years | 2 | 2.9 |
| 6months-1year | 21 | 30.0 |
| Below 6months | 39 | 55.7 |
| Missing data | 8 | 11.4 |
| Total | 70 | 100 |

Table 6
Data on determinants of cost overrun on construction projects.

| Cost-overrun determinants | C.R. {5} | R {4} | J.R {3} | IRR {2} | V.R {1} | S.I % | R.K |
|----------------------------------------|----------|-------|---------|---------|---------|-------|-----|
| Contractors Project inexperience | 42 | 22 | 30 | 0 | 0 | 91.60 | 1 |
| Inadequate planning | 45 | 15 | 7 | 0 | 0 | 91.34 | 2 |
| Inflation | 42 | 20 | 5 | 0 | 0 | 91.00 | 3 |
| Incessant variation order | 44 | 16 | 6 | 1 | 0 | 90.70 | 4 |
| Change in project design | 43 | 17 | 7 | 0 | 0 | 90.70 | 4 |
| Project complexity | 42 | 20 | 3 | 2 | 0 | 90.40 | 6 |
| Shortening of contract period | 44 | 14 | 9 | 0 | 0 | 90.40 | 6 |
| Fraudulent practices | 42 | 18 | 7 | 0 | 0 | 90.40 | 6 |
| Unstable economy | 42 | 25 | 10 | 0 | 0 | 89.55 | 9 |
| Inaccurate estimate | 40 | 15 | 12 | 0 | 0 | 88.44 | 10 |
| Overdesign | 40 | 18 | 6 | 3 | 0 | 88.40 | 10 |
| Project site location | 35 | 25 | 5 | 1 | 1 | 88.05 | 12 |
| Delay from employer | 39 | 16 | 11 | 1 | 0 | 87.76 | 13 |
| Force Majeure | 30 | 25 | 11 | 1 | 0 | 85.10 | 16 |
| Material Price fluctuations | 30 | 18 | 19 | 0 | 0 | 83.30 | 14 |
| Site conflicts | 30 | 20 | 12 | 3 | 2 | 83.00 | 15 |
| Poor workmanship | 30 | 17 | 20 | 0 | 0 | 83.00 | 16 |
| Inadequate financial provision | 29 | 17 | 20 | 0 | 1 | 82.1 | 17 |
| Contractors inefficiency | 30 | 20 | 10 | 6 | 1 | 82.09 | 18 |
| Unsteady material supply | 30 | 15 | 20 | 2 | 0 | 81.80 | 19 |
| Unpredictable weather condition | 30 | 17 | 17 | 1 | 0 | 80.90 | 19 |
| Breach of local regulation | 25 | 22 | 11 | 8 | 1 | 79.10 | 20 |
| Lack of executive capacity by employer | 7 | 10 | 20 | 0 | 0 | 58.20 | 21 |

C.R= Completely relevant, J=Just relevant, IRR= Irrelevant, VR= Very Relevant, R.I= Relevant Index.
R.K= Ranking

2. Experimental design, materials and methods

2.1. Data collection

Simple random sampling was used in the data collection through carefully structured questionnaire. A population size of seventy (70) was selected, and a total sample size of 59 respondents was used in this study, with questionnaire distributed to construction professionals. Variables pertaining to the above listed targets were identified and incorporated into questionnaires as the primary source of data. Some similar methods and contributions can be seen in [1–8].

2.2. Data analysis

The data was collated and analysed, using mean item score ranking, percentages and the use of descriptive statistics. Cost overrun determinants were ranked in percentages using the severity index. The five-scale in the questionnaire forms the response variables which are mapped with the 23 cost overrun determinants to obtain the severity index. The five-scale response variables are listed with the assigned ranks: completely relevant (CR) is ranked 4, relevant is ranked 3, just relevant is ranked 2 and irrelevant is ranked 1. The summary is shown in Table 6.

Relative agreement index (RAI) is used to obtain the rank of 15 variables that determine the impact of cost and time on project performance. This is presented in Table 7.

The construction practitioners' experiences on project cost overrun and duration were ranked distinctly and shown in Table 8. This enables for quick comparison and decision making.

The data composition is in agreement with those available in scientific literature as regards to the consequence of cost overrun. This is summarized in Table 9. The selected works relevant and similar can be found in [9–21].

Table 7
Data of impacts of time and cost on project performance.

| Effects | R.A.I | Rank |
|----------------------------------------------------------------------------------|-------|------|
| Time overrun | 0.796 | 1 |
| Tied-up Capital | 0.772 | 2 |
| Loss of investment | 0.756 | 3 |
| Materials are effectively put to use | 0.728 | 4 |
| High tendency for the occurrence of dispute between the clients and contractors. | 0.724 | 5 |
| Project abandonment. | 0.704 | 6 |
| Excessive increase on the entire project cost. | 0.656 | 7 |
| Client's dis-satisfaction | 0.640 | 8 |
| Profit loss. | 0.632 | 9 |
| Consultant dissatisfaction | 0.632 | 9 |
| Payment delay | 0.628 | 11 |
| Good completion time | 0.616 | 12 |
| Maximized project profit | 0.600 | 13 |
| Reduced building component quality. | 0.576 | 14 |
| High level of material wastage | 0.528 | 15 |

R.A.I= Relative Agreement Index

Table 8
Data of cost and time overrun survey information on residential building projects.

| Assessment Statements | Architect | Builder | Structural | Quantity surveyor |
|--------------------------------------------------------------|-----------|-----------|------------|-------------------|
| I have been involved in a building project before | 30% | 40% | 10% | 10% |
| I have experienced extension in project delivery time | 20% | 50% | 17% | 13% |
| Length Of Extension | | | | |
| 1–6 months | 0.89(i) | 0.87(i) | 0.85(ii) | 0.86(i) |
| 6–12 months | 0.84(vi) | 0.86(ii) | 0.86(i) | 0.83(ii) |
| 12–18months | 0.85(v) | 0.85(iii) | 0.82(iv) | 0.82(iii) |
| 18–24 months | 0.87(iii) | 0.85(iii) | 0.84(iii) | 0.81(iv) |
| More than 24 months | 0.86(iv) | 0.83(iv) | 0.78(v) | 0.82(iii) |
| I have experienced cost overrun in a building project | | | | |
| Percentage Of Increase | | | | |
| 0–15% | 0.78(vi) | 0.65(vi) | 0.66(vi) | 0.65(vi) |
| 15–30% | 0.79(v) | 0.76(iv) | 0.73(v) | 0.72(v) |
| 30–45% | 0.80(iv) | 0.85(ii) | 0.85(ii) | 0.89(i) |
| 45–60% | 0.82(ii) | 0.89(i) | 0.87(i) | 0.88(ii) |
| 60–80% | 0.81(iii) | 0.71(v) | 0.78(iii) | 0.75(iv) |
| 80% and above | 0.83(i) | 0.75(iii) | 0.76(iv) | 0.79(iii) |

Table 9
Data of consequences of cost overrun.

| Effects of Cost overrun. | Percentage |
|---------------------------------------------------------------------------------------------------------------------------------|------------|
| Tying down of clients capital | 80% |
| Company/firms liability to insolvency | 50% |
| Liability of companies or firms to bad debt or bankruptcy | 70% |
| Under-utilization of manpower resources | 55% |
| Tendency for an increase project cost resulting from payments for idle and unproductive time arising out of contractors claims. | 93% |
| Tendency for an increase project cost resulting from payments for idle and unproductive time | 90% |
| Projects abandonment | 60% |
| Under-utilization of plants and equipment | 93% |

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Transparency document. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.dib.2018.02.035>.

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