

# **Subcontractor's Selection Practice in the Gaza Strip**

Adnan Enshassi

School of Civil Engineering, IUG, Palestine

aenshassi@gmail.com

Younis Shoman

Ministry of Public Works and Housing, Palestine

## **Abstract**

Construction contracting involves subcontracting. The evolution of subcontractors has a substantial impact on the construction process. An increasing amount of building construction projects are contracted to subcontractors. Despite the significant role that is played by subcontractors, little attention has been paid to the selection process of specialty contractors. The aim of this study is to identify and evaluate the main effective factors considered by general contractors in the selection of subcontractors. This study is based on a questionnaire survey of thirty-one main contractors in the Gaza Strip. The results indicate the most important effective factors in subcontractors' selection are project size and complexity, applying specification and quality, compliance with programming and quality, experience of subcontractor, and nature and specialty of subcontractors.

**Keywords:** subcontractor, contractor, selection factors, construction

# 1. Introduction

Subcontractors play a vital role in the construction sector, which contributes in the largest part of gross national product. Subcontractors contribute significantly to the capital risk, resources, managerial effort, and business expertise supporting the largest industry in the country (Mouton and Johnston 1989). In the United States, in many projects, particularly building projects, it is common for 80-90% of the work to be performed by subcontractors (Hinze and Tracy, 1994). Villagar Eia and Cordoso (cited in Shimizu and cordoso, 2002) stated that during the last years, subcontracting has increased in Brazil, and it is known that, subcontracting achieves similar levels to the ones mentioned by Hinze and Tracy.

In the UK and Hong Kong, the contribution of specialist and trade subcontractors to the total construction process can account for as much as 90% of the total value of the project (Kumaraswamy and Mathews 2000, Nobbs 1993; Mathews et al. 1997). The trend toward more subcontracted work accelerated as the technical development of building materials and methods escalated the requirement for craft skill and knowledge. Quality control and labor management problems on construction projects became less complicated for general contractors utilizing specialty trade subcontractors in lieu for furnishing all craft labor themselves (Mouton and Johnston 1989). The purpose of this study was to identify and evaluate the main important factors, which is considered by contractors in subcontractors selection.

## 2. Subcontracting background

Subcontracting has been defined as a legal-economic relationship between two agents, in which the characteristic criteria are substitution and subordination. The substitution criterion means that the subcontractor executes the operation with technical and financial risks, instead of the job assignor; the subordination criterion means the subcontractor must follow the direction given by the contractor (Pagnani, cited in Shimizu and Cardoso, 2002). Another definition was given by Hinze and Tracy (1994) who stated that the subcontractors are specialty contractors who are hired to perform specific tasks on a project. Subcontracting can be classified as volume subcontracting and specialist subcontracting. Volume subcontracting can be used when an enterprise commission a subcontractor because, while technically able to carry out the operation, it is overloaded and has to obtain additional capacity from another source. Specialist subcontracting can be used, when the main contractor obtains goods or services, which he does not produce or is not able to produce himself.

Beardsworth (1988) pointed out that subcontracting could be seen as an organizational alternative for some economic activities. Firms are decentralizing their jobs more and more, allowing subcontracting to become a basic part of the work organization. Firm does not need to have the control of all the value string, being able to externalize non-strategical activities, aiming to reduce costs. The subcontractor's typical source of work is the general contractors that assume responsibility for complete construction of the project. At any point of time, the

subcontractor is providing specialty construction services to a number of general contractors with varying expertise in subcontract development, subcontractor management and relations; project management, coordination, and control; and project cash-flow reliability. Decisions on individual projects are often influenced by the objective of sustaining an on-going relationship. Both the short-term (project) and long-term relationship with the general contractors are essential to the success of all specialty contractors (Mouton and Johnson 1989).

Bennett and Ferry (1990) described building firms as organized into a consistent operating core based on their individual capabilities. Construction companies are becoming construction managers or contractor managers, transferring construction work to specialists. Subcontractors are specialists' agents in the execution of a specific job, supplying work force, besides materials, equipment, tools or designs. They respond only for the executed part of the workmanship, acting as agents of the production system of the contractor company. Specialty contractors are construction "job shops", performing construction work that requires skilled labor from one or at most a few specific trades and for which they have acquired special-purpose tools and equipment as well as process know-how (Tommelein and Ballard 1997).

### 3. Research method

This study was based on a questionnaire survey of general contractors in the Gaza Strip. Twenty factors that have an effect on subcontractor's selection have been identified from a literature review (Shimizu and Cordoso 2002; Hinzi and Tracy 1994, Mouton and Johnston 1989, Kumaraswamy and Mathews 2000) and interviews with local contractors. The content and understanding of the questionnaire have been reviewed and tested. Thirty-seven questionnaires have been sent to main contractors randomly. Thirty-one completed questionnaires were returned after follow-up, which represented an overall response rate of nearly 84%. Respondents were asked to express their opinions "attitudes" of effective factors that influenced subcontractors selection on 5 point Likert scale (5 = very often, 4=often, 3 = sometimes, 2 = rarely, 1 = never). For determining the importance of different factors in subcontractors selection, the importance index was computed using the following formula:

$$\text{Importance Index} = \frac{5N_1+4N_2+3N_3+2N_4+N_5}{5(N_1+N_2+N_3+N_4+N_5)}$$

Where;

N1 = number of respondents who answered, "Very often."

N2 = number of respondents who answered, "Often."

N3 = number of respondents who answered, "Sometimes."

N4 = number of respondents who answered, "Rarely."

N5 = number of respondents who answered, "Never

The five point scale described above was used to calculate the importance index of different factors by assigning ranks to the importance index, with low important index scores assigned low ranks and high scores allocated high ranks.

## 4. Results

The contractors' respondents who participated in this questionnaire survey have been engaged in the local construction industry for more than 15 years. Therefore, the information provided regarding the effect of the 20 factors on subcontractor's selection is considered reasonably reliable. Table 1 tabulates the importance index and the ranks of the effect of the twenty factors, which is considered in subcontractors' selection. The descriptive results indicate that project size, complexity, and compliance with the required specification and quality of work were ranked first and second with important index values of 0.93 and 0.90, respectively. This is a realistic phenomenon where large and complex projects require a number of specialized subcontractors. Both of project size and complexity required high qualified staff and distributed management responsibility.

*Table 1. Important Index and Ranks of factors influence on subcontractor's selection.*

Effective factors	Number of respondents scoring					Important index	Rank
	5	4	3	2	1		
Project size and complexity	20	11	0	0	0	0.93	1
Compliance with specification and quality	21	6	3	1	0	0.90	2
Compliance with project schedule	19	9	2	0	1	0.89	3
Previous experience and reputation	20	7	3	0	1	0.88	4
Natural and specialty of subcontractor	15	9	7	0	0	0.87	5
Practical and technical ability	17	10	2	2	0	0.85	6
Good quality record	18	6	4	3	0	0.84	7
Qualified supervisory staff	13	12	4	2	0	0.83	8
Creativity	9	15	4	2	1	0.79	9
Financial ability	10	11	8	1	1	0.78	10
Lowest bid price	14	5	6	4	2	0.76	11
Good health and safety record	10	7	8	4	2	0.72	12
Relationship with general contractor	9	8	9	3	2	0.71	13
Familiarity of work and location	7	9	8	5	2	0.69	14
Assisting in pricing the tender	8	6	8	4	5	0.65	15
Ability in dealing with uncertainty	6	9	8	2	6	0.64	16
Bearing the risk in case payment delay	6	4	9	7	5	0.59	17
Registration and classification category	5	5	5	11	5	0.56	18
Tax, insurance and licenses	5	5	4	8	9	0.53	19
Bearing responsibility in case of accidents	1	6	7	9	8	0.49	20

Compliance with project duration and schedule and subcontractor's previous experience and reputation were ranked third and fourth with important index values of 0.89 and 0.88, respectively. This indicates that general contractors are interested to select subcontractors who have good reputation and capable to complete projects on time and according to schedule in order to avoid delay and additional expenses. Both natural and specialty of subcontractors, and practical and technical ability were ranked at position five and six with important index values of 0.87 and 0.85 respectively (Table 1). Some activities need specialized and highly trained staff that main contractors required to accomplish and do not have the needed specialized staff. Therefore, this factor is crucial in the decision of subcontractor's selection. The general contractor is also interested in selecting subcontractors who have practical and technical experience and have got the required tools, equipments, and plants.

Good quality record is the seventh important factor with an important index value of 0.84. It focuses on work achievement and minimized wastage of time and other resources on construction fields. Qualified supervisory staff is the eighth rank factor with an important index value of 0.83. A close cooperation and mutual understanding between main contractors and subcontractor's supervisory staff can improve the efficiency and performance of the work and can minimize conflicts and disputes. Creativity of work and financial ability were ranked ninth and tenth with important index value of 0.79 and 0.78, respectively. General contractors are interested in working with creative subcontractors who may suggest new and effective method of construction. The main contractor is looking for subcontractors who have sound financial ability and record so that they can accomplish the contracted work successfully, and can cope with uncertainty.

Both, lowest bid price and good record in applying safety regulation and health at construction work were ranked at position 11 and 12 with important index values of 0.76 and 0.72, respectively. These results indicate that the general contractors have a moderate attention to subcontractors who submit the lowest bid price. The final responsibility for the safety at work falls on the general contractors, as well as the implementation of a safety program, the commitment and supervision of the subcontractors. The safety for floating and unknown worker and the lack of familiarity of the worker with working atmosphere aggravates this problem.

Subcontractor relationship with general contractors and familiarity of work and location were ranked at position 13 and 14 with important index values of 0.71 and 0.69, respectively. The results indicate that the social and cultural relationship between general contractors and subcontractors still play an important role in subcontractor selection although it was ranked at 13 position. Familiarity of work and location has little impact on general contractor's decision as Gaza Strip is considered a narrow geographical area. Both, assisting general contractors in pricing the tender and ability in dealing with uncertainty were ranked in position 15 and 16 with important index values of 0.65 and 0.64, respectively. This followed by bearing the risk in payment delay and registered subcontractors; they were ranked in 17 and 18 position, respectively (Table 1). It is clear from the results that, the general contractors did not put heavy weight on these factors in selecting subcontractors. Finally, tax, insurance, license and bearing

responsibilities in case of accidents and liabilities were ranked in last positions 19 and 20 with important index values of 0.53 and 0.49 respectively.

## 5. Conclusion

This paper aims at identifying the factors considered by general contractors in the selection of subcontractors and to determine their level of importance from the general contractor's viewpoint. Twenty factors were considered in this study. The general contractors have ranked the following ten factors which affect their decision in selecting subcontractors:

- Project size and complexity
- Compliance with specification quality
- Compliance with project schedule
- Subcontractor previous experience and reputation
- Nature and specialty of subcontractors
- Practical and technical ability
- Good quality record
- Qualified supervisory staff
- Creativity
- Financial ability

This study provides an insight into the subcontractors' selection practice in the Gaza Strip. Post war conditions in Gaza Strip after 27th of December 2008 were deepening the suffering of people as the Strip went through massive damage as a direct result of the conflict. Damage was assessed directly after a cease-fire took place on 18th of January 2009. People, buildings, infrastructure, and environment all were severely affected. Housing and infrastructure reconstruction is primarily focused on repairing and recovering essential utilities and residential infrastructure, such as housing, water and reservoirs, sanitation, electricity, fuel, transportation and roads, and telecommunications. Road reconstruction should be prioritized according to this hierarchy. Reconstruction projects are initiated as a response to the needs of a disaster-affected community. A successful reconstruction project must take into consideration issues including resource availability, cultural differences, local regulations, political environments, human resource deployment and the selection of subcontractors. Further research in this area is

recommended considering a larger sample of subcontractors in order to add a supplementary perspective.

## References

Beardsworth, A. (1988). "Management, transience and subcontracting the cases of the construction site". *Journal of management studies*, ASCE, Vol. 25, No. 6, 603-263.

Bennett, J. and Ferry, D. (1990). "Specialists contractors: a review of issues raised by their new role in building. *Construction Management and Economics*, vol. 8, 259-263.

Bresnen, M. and Marshall, N. (2000). "Partnering in construction a critical review of issues, problems and dilemmas". *Construction Management and Economics*, Vol. 18, No. 2, 229-237.

Hinze, J. and Tracy, A. (1994). "The contractor-subcontractor relationships :relationships: the subcontractor's view". *Journal of Construction Engineering and Management*, ASCE, Vol. 120, No. 2, 274-287.

Kumaraswamy, M.M. and Mathews, J.D. (2000). "Improved subcontractor selection employing partnering principles". *Journal of Management in Engineering*, Vol. 16, No. 3, 47-56.

Mathews, J., Thorpe, A., and Taylor, A (1997). "A comparative study of subcontracting in Hong Kong". *Campus construction papers (CIOB)*, U.K, 13-16.

Mouton, J. and Johnston, H. (1989). "Construction subcontracting as an educational topic". *ASC Proceedings of the 25th annual conference*, Nebraska.

Nobbs, H. (1993). *Future role of construction specialists* The Business Round Table, London.

Shimizu, J. and Cardoso, F. (2002). "Subcontracting and cooperation network in building constructions a literature review". *Proceedings IGLC*, Gramado, Brazil.

Tommelein, I.D and Ballard, G. (1997). "Coordinating specialists". *Technical report No. 5*, Civil and Environmental Engineering Department, University of California, Berkley, U.S.A.