

## Analysis of Government Residential Projects Overruns in Jordan

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**Abstract:** Construction sector is one of the major drivers in Jordan economy to many sectors related directly or indirectly to construction sector. Construction projects require a range of services that provide jobs for a large fraction of population depends on. Recently, the construction industry economy is facing many challenges that caused slow down. Therefore, a deep analysis for the construction industry is needed. This research focuses on the understanding of Over Run (OR) situation in building projects in Jordan. It is designed broadly in two parts. Part one aimed at establishing critical issues of OR and their causes in building projects in Jordan. This part involved four stages; problem definition, literature review, case study. From the analysis, we identified that overruns as major challenge that often cause additional cost burden on projects budgets.

**Key words:** Construction projects, Jordan, overrun, overcosts, budgets, cost

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### INTRODUCTION

In Jordan, as in many countries, contracting is one of the imperative fields of economic growth and developments (Abdrzakov *et al.*, 2015). Therefore, contracting has taken places that are directed towards enhancing the performance of projects quality.

The construction industry in Jordan according to the minister of public works and housing, the construction industry in Jordan is a major contributor to the Jordanian gross domestic product (it contributes to about 15% of the Jordanian economy). The industry is considered one of the key drivers in building a strong local economy. A high level of professionalism and organization characterizes the sector and it includes 1716 Jordanian contractors graded by expertise and capabilities.

Assistance is available for specialized and highly qualified staff of engineers and technicians. Materials and expensive equipment/resources and specifications highlight the scale of the financial investment put into the construction industry. The development of this sector is evident both institutionally and technically as is the development in other sector of the economy. The construction industry is valued at hundreds of millions of Jordanian dinars per year, consisting of more than a thousand construction companies along with engineering consultancy businesses with over ten thousand engineer's working for them (Al-Awad, 2015).

According to Oxford Business Group the construction sector saw renewed growth in 2013 with forecasts for continued expansion in 2014. Loans extended in 2013 reached \$5.76 billion Dinars, accounting for 21.5% of credit to all industries. While housing accounted for the bulk of construction activity, several major real estate and tourism development projects are driving opportunities for large contractors, particularly in the Red Sea Port of Aqaba. Meanwhile in the capital, Amman, the downtown area of Abdali has been the focus of major redevelopment projects including commercial space, retail facilities and residential units at a total investment cost of \$5 billion dinars.

**Overview of construction sector in Jordan:** The construction sector is one of the most important economic sectors as it is characterized by the diversity and complexity of its sub-sectors making it more vulnerable to economic, demographic and social changes. Also, the activity of the real estates market as a key driver heavily and directly affects this industry.

The construction sector has developed steadily in the last years as growth is influenced by many interrelated factors, the most important of which is the general political climate, the safe investment environment and the good infrastructure.

The construction sector includes the following supporting sectors: construction stones, stone cutting

and composition and the production of panels of marble, granite, basalt and other construction products, cement, concrete and gypsum products: tiles, bricks and boards pipes, ready mixed concrete, rock wool and insulation products, asphalt products, metal structures and metal rebar and structural products manufacturing, prefabricated buildings, glass products used in construction and fiber glass, ceramic products, the non-metallic insulation products for building and construction, pipes. Decoration, building and construction services.

Despite of the importance of contracting, some problems rise such as the overruns which affect cost and time this reflects on the pricing rate and the estimator's decision and makes gab between contractors offers.

Most construction projects in Jordan have overruns that occurs during the progress of the on-going stage. It increases the cost of the project and increase time needed to complete, moreover, extra value of the cost will not be utilized as it was planned because of the time shortage that will cause many problem to the contractors, consultant and the client.

It is necessary to analyze the conditions of particular application of the contract, hence, if the engineer is fully independent when issuing such an order then it can be considered a contractor in a works contract. To the contrary, if such authority is restricted then the engineer

may well be considered an agent. But, if the engineer has no discretion and authority whatsoever is doing so, it can be then considered as a mere employer.

**Number and volume of construction projects:** The total number of companies operating in the construction industry sector registered in the three chambers of industry (Amman, Zarqa and Irbid) in the year 2014 has amounted to 2842 companies, compared to their number in the year 2013 in which the number of enterprises reached 2980 registering 5% deficit. The difference in both industrial and craft establishments operating in the sector is shown in Table 1.

Despite the decline in the number of the industrial establishments operating in this sector there has been a growth in the registered capitals of these companies as they rose from 297 million Jordanian Dinars in the year 2013 to about 316 million Jordanian Dinars in the year 2014, indicating a 6.3% growth (Fig. 1).

Table 2 shows the average registered capital of each entity of industrial and craft enterprises registered in the three chambers of industry in 2014 (Fig. 2).

**Number of workers:** The total number of workers in the companies operating in the construction industry sector that are registered in the three chambers of industry (Amman, Zarqa, Irbid) has amounted to 18005 workers in the year 2014 compared to their number in the year 2013 which reached 17795 workers indicating a 1.2% growth (Table 3 and 4).

Table 1: Number of establishments in the construction industry sector in 2013-2014

Local chambers	Industrial establishments			Craft establishments			Total		
	2013	2014	Growth (%)	2013	2014	Growth (%)	2013	2014	Growth (%)
Amman	117	74	-37	1141	1191	4	1258	1265	0.6
Zarqa	72	76	6	978	1016	4	1050	1092	4
Irbid	19	36	89	653	449	-31	672	485	-28
Total	208	186	-11	2772	2656	-4	2980	2842	-5

Table 2: Total registered capitals for establishments operating in the construction industry sector in 2013-2014 (million dinars)

Local chambers	Industrial establishments			Craft establishments			Total		
	2013	2014	Growth (%)	2013	2014	Growth (%)	2013	2014	Growth (%)
Amman	152,403,277	164,650,376	8.0	19,340,514	25,228,985	30.4	171,743,791	189,879,361	10.6
Zarqa	114,774,000	114,489,000	-0.2	4,130,051	4,174,651	1.1	118,904,051	118,663,651	-0.2
Irbid	1,801,000	2,651,000	47.2	4,674,000	4,534,000	-3.0	6,475,000	7,185,000	11
Total	268,978,277	281,790,376	4.8	28,144,565	33,937,636	20.6	297,122,842	315,728,012	6.3

Table 3: Number of workers at establishments operating in the construction industry sector in 2013-2014

Local chambers	Industrial establishments			Craft establishments			Total		
	2013	2014	Growth (%)	2013	2014	Growth (%)	2013	2014	Growth (%)
Amman	6,130	6,381	4.1	4,037	4,672	15.7	10,167	11,053	8.7
Zarqa	3,109	2,649	-14.8	2,627	2,707	3.0	5,736	5,356	-6.6
Irbid	395	621	57.2	1,497	975	-34.9	1,892	1,596	-15.6
Total	9,634	9,651	0.2	8,161	8,354	2.4	17,795	18,005	1.2

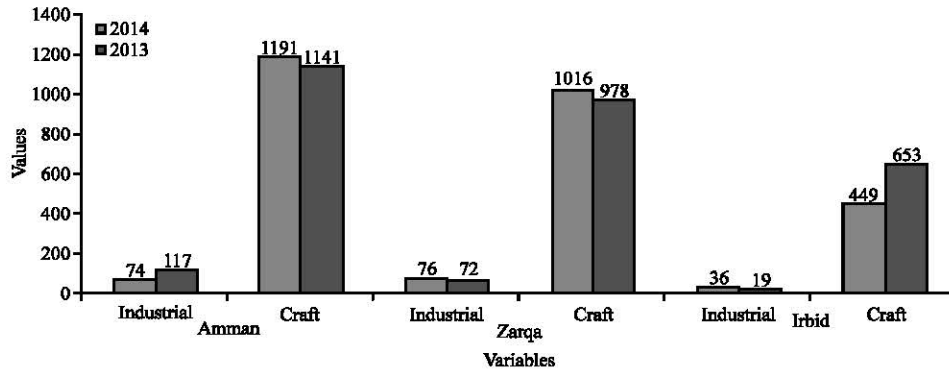


Fig. 1: Number of establishments operating in construction industry sector

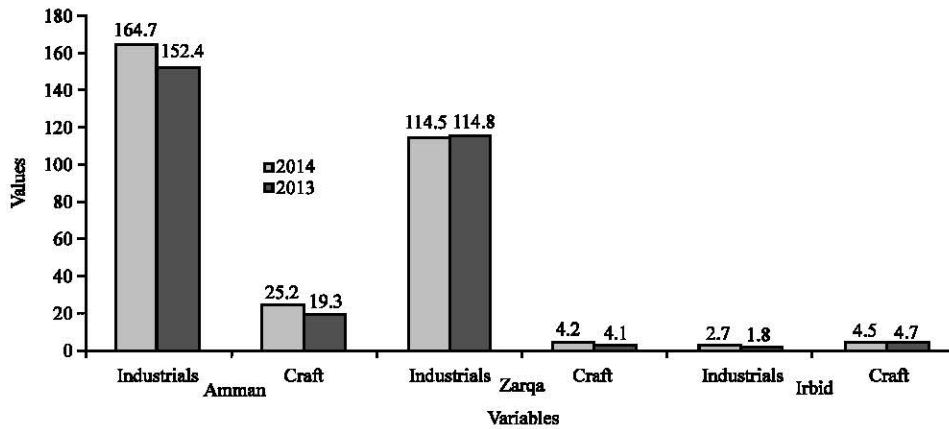


Fig. 2: Total capital of the craft and industrial establishments in 2013-2014 according to chamber of industry (Million dinars)

**Challenges to construction projects:** Although, construction industry is a major sector in the economy, generating both, employment and wealth. However many projects experience extensive delays and thereby exceed initial time and cost estimates (Sweis *et al.*, 2008).

There are different types of delays affecting construction projects. Delays and cost overruns have significant implications from economic as well as political point of view. Due to delays in project implementation, the people and the economy have to wait for the provisions of public goods and services longer than necessary.

In construction, delay could be defined as the time overrun either beyond completion date specified in a contract or beyond the date that the parties agreed upon for delivery of a project. It is a project slipping over its planned schedule and it is considered as common problem in construction projects. To the owner, delay means loss of revenue through lack of production facilities and

rent-able space or a dependence on present facilities. In some cases, to the contractor delay means higher overhead costs because of longer work period, higher material costs through inflation and due to labor cost increases (Assaf and Al-Hejji, 2006).

Finishing project within planned duration and cost at project closing are the two criteria for successful project implementation and management. In Vietnam, regularly, construction projects have met delays and cost overruns. his research has employed a questionnaire survey to elicit the causes of this situation by interviewing 87 Vietnamese construction experts. About 21 causes of delay and cost overruns appropriate with building and industrial construction project were inferred and ranked with respect to frequency, severity and importance indices. Spearman's rank correlation tests showed that there are no differences in the viewpoints between three principal parties in the project. A comparison of causes of time and cost overruns was done with various selected

construction industries in Asia and Africa. Factor analysis technique was applied to categorize the causes which yielded 7 factors: slowness and lack of constraint, incompetence, design, market and estimate, financial capability, government and worker. These findings might encourage practitioners to focus on delay and cost overruns problem that might have existed in their present or future projects. Le-Hoai *et al.* (2008) variation, according to Oladapo (2007) is any change to the basis on which the contract was signed. Variation involves not only changes to the work or but also changes to the working conditions themselves (Ndiokubwayo, 2009). Standard forms of contract provide that no variation shall full fill a contract, variations are changes within a contract and not changes of the contract (Oladapo, 2007).

Variation from work plan is common in construction that it is hardly possible to complete a project without changes to the plans or the construction process itself (Oloo *et al.*, 2014). Thus, according to McEniry and Ibbs (2007) there will be changes to scope, time, cost and/or quality on most, if not all, construction projects. Various studies have identified variation orders among the causes of project cost and time overruns which according to Sterman (1992) are endemic problems in international construction. However, the available literature gives little indication of their contributions to project cost and time overruns (Ali *et al.*, 2009; Oladapo, 2007).

**MATERIALS AND METHODS**

**Data description:** Data collected include closed government construction projects financial data collected through several visits to the Ministry of Public Work and Housing (MPWH). Then data was analyzed manually.

According to MPWH about 4,342,437,117 million dollars were spent in public governmental projects between year 2010 and year 2015, 7.46 million dollars of them were additional cost which represent 3.14% of the total cost. according to clause 12.3 of International Federation of Consulting Engineer (FIDIC). For each item of work, the appropriate rate or price for the item shall be the rate or price specified for such item in the contract or if there is no such item, specified for similar work. Any item of work included in the bill of quantities for which no rate or price was specified shall be considered as included in other rates and prices in the bill of quantities and will not be paid for separately. However, a new rate or price shall be appropriate for an item of work if: the measured

quantity of the item is changed by more than 25% from the quantity of this item in the bill of quantities or other Schedule, this change in quantity multiplied by such specified rate for this item exceeds 0.25% of the accepted contract amount, this change in quantity directly changes the cost per unit quantity of this item by more than 1% and this item is not specified in the contract as a “fixed rate item”. As we note here the cost of the in contracts exceed 1%.

**RESULTS AND DISCUSSION**

The collected data was analyzed per year as shown Table 5, the maximum projects awarded were in 2015 with 117.78 million Jordanian dinners which represent 13.15% of the total projects. The analysis goal is to evaluate the relationship between the amounts of the projects cost and the amount of overruns.

Table 6 present the percentage of the differences in the whole projects. Year 2015 was in the first rank with 37.33% from the whole projects with 2.786 million dollars as its shown in Fig. 3. The time with highest difference in Projects budgets is 2011 change most.

Table 5: Contracts awarded 2010-2014

Years	Awarded	After complete	Difference	Percent
2010	86,734,236.30	86,764,377.64	30,624.435	-
2011	61,564,691.39	62,445,813.34	1,852,162.173	3.0
2012	41,536,395.67	42,038,018.12	1,142,756.755	2.8
2013	59,533,107.16	60,214,128.32	705,082.671	1.2
2014	69,873,090.73	70,723,471.52	944,476.547	1.4
2015	115,002,190.50	117,781,159.5	2,785,299.090	2.4
Summation	874,210,680.20	454,887,771.8	7,460,418.208	2.1

Table 6: Fraction of contracts awarded during last 5 years

Years	Percentage of total projects awarded (%)	Differences(%)
2010	9.92	0.41
2011	7.04	24.83
2012	4.75	15.32
2013	6.81	9.45
2014	7.99	12.66
2015	13.15	37.33

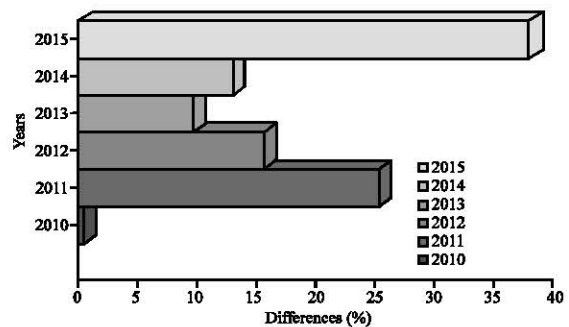


Fig. 3: Difference in contracts awarded over 5 years

## CONCLUSION

As we see above there is a significant overcost in the residential construction governmental projects in Jordan and as we explained there is a strong relationship between the overrun and the value of the project. The major reasons behind the additional costs is the change order issued by owner. This change of order causes delays in schedules which may incur additional opportunity costs.

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