Performance Evaluation of the Investment Projects during the Implementation Phase (Najaf province as a case study)

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ABSTRACT

The construction project is a very complicated work by its nature and requires specialized knowledge to lead it to success. The construction project is complicated socially, technically and economically in its planning, management and implementation aspects due to the fact that it has many variables and multiple stakeholders in addition to being affected by the surrounding environment. Successful projects depend on three fundamental points which are cost-time, performance and specifications. The project stakeholder's objective to achieve best specifications and the cost-time frame stipulated in the contract.

The question is, was the optimum implementation accomplished? The provision for the success of the project is how are the daily activities managed by the three stakeholders of the project (contractor, owner, and consultant) and their technical and practical capability to attain the balance of the project fundamental points (cost, time and quality) taking into account the project objectives that were set by the owner. Despite the way, logical framework management and project's major steps there is a group of elements which become major measures to determine the success or failure of the project, the research interested in these elements by a thorough study of references related to the success of a constructional project. To reinforce the theoretical study a field assessment of the housing project; this led to the recognition of the major elements that caused breaches of the evaluation criteria.

The closed questionnaire and the regular forms based on the data and information collected through the theoretical review and the closed questionnaire to conclude and examine some concepts related by assessing the quality of building materials used in residential investment projects through the stages (planning - design-implementation)

Through the research a lot of deductions were made, the most important is that there cannot be an evaluation system without having a holistic monitoring system in Iraq. It was also deduced that the most important source of project failure is not allocating enough time to the planning phase. Some other recommendations and suggestions for future studies were made also.

Key words: evaluation**,** investment**,** Implementation**,** performance …etc.

تقييم الاداء المشاريع الاستثمارية خلال مرحلة التنفيذ (محافظة النجف حالة دراسية)

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الخلاصة

إن المشروع الإنشائي بطبيعته هو عمل معقّد جداً، ويتطلب معرفة متخصصة لتقوده نحو النجاح. فالمشروع الإنشائي معقّد إجتماعياً وتقنياً وإقتصادياً في التخطيط والإدارة والتنفيذ وذلك لكثرة المتغيرات وتعدد الأطراف فضلا عن تأثره بشكل مباشر بالبيئة المحيطة به.تعتمد المشاريع الناجحة على ثلاثة مرتكزات أساسية هي الكلفة والوقت وتحقيق المواصفات. تهدف أطراف المشروع الى تحقيق المواصفات والأداء الوظيفي الأفضل ضمن الوقت والكلفة المتعاقد عليها ولكن يبقى السؤال القائم، هل تم

التوصل الى الحالة المثالية لتنفيذ المشروع ؟ إن نجاح المشروع يبقى رهينة بالعمل اليومي ضمن نشاطات المشروع وبكيفية إدارة هذه النشاطات من الأطراف الثلاثة المشتركة (المقاول، صاحب العمل، الإستشاري) ومقدرتهم العلمية والعملية في الوصول الى توازن مرتكزاته الثلاثة (الكلفة والوقت والنوعية)، مع الأخذ بنظر الإعتبار الأهداف الرئيسة التي وضعها صاحب العمل للمشروع. بغض النظر عن الطريقة أو إطار العمل وإدارته وبغض النظر عن عدد الخطوات الرئيسية ، إن نجاح اي مشروع أو فشله يعتمد على مجموعة مشتركة من العوامل التي تمثل معايير رئيسية لذا إهتم البحث بدراسة هذه المعايير وذلك من خلال دراسة شاملة للأدبيات ذات الصلة بمعايير نجاح المشروع الإنشائي. ولغرض دعم الدراسة النظرية تم إجراء دراسة ميدانيه تمثلت من خلال مسح ميداني لـ مشروع سكني والتعرف على اهم العوامل التي تسببت في حدوث التجاوزات على أهداف التقييم، القيام باستبيان مغلق وتحليل ثم تصميم استمارة الاستبيان المغلق النظامية بالاعتماد على ما جمع من بيانات ومعلومات من خلال الدارسة النظرية ،للتعرف والتحقق من بعض الامور المتعلقة بواقع تقييم نوعية مواد البناء المستخدمة في المشاريع الاستثمارية السكنية خلال مراحل (التخطيط - التصميم-التنفيذ). من خلال البحث تم التوصل الى العديد من الإستنتاجات أهمها: إنه لايمكن إن يكون هنالك نظام للتقييم دون وجود نظام متابعة متكامل. كما واستنتج البحث الى إن أهم مصادر فشل المشروع هو عدم منح العملية التخطيطية الوقت الكافي ، فضلا عن مجموعة من التوصيات والمقترحات لدراسات وبحوث مستقبلية.

1. INTRODUCTION

The Iraqi economy is one of the economies of the developing countries which depend on one resource for income (oil). After the large economic transformations produced by going towards the market economy and not depending on one origin of fund, the variety of the origins of the income, such as investment was directed to.

Any economic project starts with an idea designed to add new value to the national capital by directing part of the financial and human resources to create a unit of new economic able to create other values in order to achieve the interests of the owner of the project on the one hand and on the other hand increase the national income and that which drives the economy national forward in terms of the interaction of the project with its own environment, public and activation of all economic sectors associated with the project and the availability of the basic principles of investment which should be available in order to polarize the investors through issuing law of investment No.13 of the year 2006 for the sake of developing the process of economic and social development to bring the modern scientific experiences, develop the staff, find work opportunities for the Iraqis through encouraging the process of investment and widening its base and supporting the process of erecting the investment projects of the economic and development profits .

2. EVALUATION AND INVESTMENT

2.1 Definition of Evaluation

Evaluation, as a concept, can be defined as "a set of processes conducted in order to compare between the results obtained with the preset objectives of the project, so that future decisions can improve the remaining part of the project or other future projects. No doubt, this requires that project objectives should be clearly determined during planning stage. A comparison should be made between the results of the work activities and these objectives using scientific and practical measures "One of the main objectives of project evaluation is to compare between results and preset objectives. This sheds the light on a major problem in project assessment that is project objectives should be well-understood and specified as they were set during the planning stage. Project objectives should satisfy the following requirements**, RPS &INAC, R., 2000.**

2.2 The Role of Evaluation in a Project Life Cycle

The process of evaluation consists of consecutive steps for a certain project as shown below**, Westland, 2006.**

1. The project planner should have good knowledge of the project objectives which have to be measurable quantatively, by time and qualitatively.
2. Upon defining the objectives a comprehensive plan should be made for the project. Before adopting, the plan should be evaluated through the feasibility studies of the project.

3. During the project implementation, the work should be supervised, followed up and assessed in order to make the required changes timely.
4. After the completion of project, the results are evaluated against objectives; the figure below shows the role of assessment in project life cycle.

2.3 Relation between Performance Evaluation and Planning

Planning, as defined by (Weick, 1995) is a vision of the desired future and the means required to achieve it**, Weick,1995.**

Planning also is defined by (Simon and Schuster, 1994) as a set of formal actions aiming to achieve clear results in the form of an integrated system for decisions**, Simon, and Schuster, 1994.**

2.4 Relation between Performance Evaluation and Monitoring

Monitoring involves making sure whether everything is carried out according to the preset plan, regulations and principles. Monitoring aims at highlighting the weakness points and errors to deal with them and to make sure they will not occur again. The monitoring is applicable to many things including laborers and operations**.**

Dervavux and Coulaud (1999) considered that the purpose behind supervision is to ensure that the decisions taken by the top management are followed effectively and efficiently in order to improve the company performance**, Westal , and Joy Frechtling, 2002.**

Elements of monitoring include quantity, methods, cost, and time. Process of monitoring involves the following steps**, Simon, and Schuster, 1994.**

1. Defining of supervision criteria and measures.
2. Measuring performance and comparing it with criteria.
3. Correction of any deviation from criteria and plans.

2.5 Relation between follow up and Evaluation

Assessment during implementation is (the comparison between the current situation and the planned path for project). Also, evaluation is the final resultant of what follow up system has reached. Following up process can be defined as a function that is carried out by the administration of project in order to validate that work proceeds according to the preset objectives efficiently and sufficiently and within the time schedule**, O'Reilly, 2005.** It is also has been defined as "the activity carried out by the management to follow up the implementation policy previously set up and evaluating it and finally to correct any weakness it might undergoes so that the desired objectives are achieved".

Based on the above, follow up generates the performance criteria which will be used to measure the progress towards reaching the objectives. That is through the determination whether the resources of the project are used in a proper way that leads towards achieving the objectives**, O'Reilly, 2005.**

2.6 Reasons of Construction Project washout

Many studies have been performed to tackle such question in order to answer it. These studies have reached too many conclusions which focus on two reasons, project management and human factors. In general, most of the studies have classified the causes of failure of construction projects into three groups:

1. There is no realistic estimation of cost and duration of the project as well as wrong distribution of resources because of the weak planning of the project**, Vorster, and Michael, 2005.**
2. Project objectives are not clear neither realistic? Moreover, there is no agreement on project delivery.
3. The project is not well studied. This includes weakness in the implementation support, lack of expertise as well as the lack of pursuance by project owner.

4. Voster, Michael C (2005) defined the reasons of project failure in addition to the percentages of their effects on the project failure as shown in Table (1).

2.7 Success Factors of a Construction Project

The success factors of any construction project are: time, cost, and quality which together represent the corners of the project management triangle which are shown in **Fig.1, Smith, 2002.**

2.8. INVESTMENT

Foreign investment is a term that is usually used when a normal person or juristic person utilizes its expertise, efforts or money to perform economic project either alone or jointly with a natural or juristic person, with local or foreign investor, or jointly with government or its citizens. The host country has the right to direct investors towards certain economic activities according to its needs. In Iraq, this direction comes through the Modified Investment Law No (13) of 2006**, Iraqi Law, 2006,** which deal with several sectors? The sectors included in the mentioned law are; housing, tourism, industry, health, education, agriculture, and recreational sectors. This happens together with other relevant legislations such as Article (15) of tax law of 2006 related to exemption from tax which designed to attract and encourage foreign capitals to invest in several diverse fields.

Investment can also be defined in another way as (the transfer of foreign capital, knowledge and advanced technical and administrative technology so as to generate economic, social, and administrative development that can lead to develop and revive the host country through the new companies and in participation with national capital**.**

The research will cover investment and development experienced in Egypt and Iraq.

2.9 Investment and its Objectives in Egyptian Law

Egypt had a law No. 65 of 1977 "Arab Investment Law" but was not active because of the socialist orientation at that period and the political system instability**, The Investment Egyptian Law, 1977.** The latest investment law which is still working in Egypt was PRESIDENTIAL. M. D, No. 1144 of 2002**, PRESIDENTIAL. M. D, 2002.**

In an attempt to encourage Arab and foreign investment operating in Egypt, the law offered guarantees to the investor against changes in the country social system and the changes in the economic policy. The investor irrespective of his nationality or place of residence enjoyed these guarantees.

These guarantees were as follows:

1. The project real estate cannot be expropriated either wholly or partially unless for public interest and according to the law. Compensation should be fair and according to market value.
2. Companies that invest foreign or Arab monies were considered private companies even if the Egyptian money used in the investment belongs to the public sector, that is, the newly established companies were subjected to legislations on private companies, in other words, the law on private properties even if the Egyptian money used in the investment belongs to the public sector, thus facilitating the measures and providing flexibility to ensure project success.
3. Among the guarantee was the project invested money cannot be sequestrated, frozen, confiscated or placed under receivership without court order. In other words, these measures were limited to extrajudicial punishment. Any court order was valid.

In addition, the Egyptian law on investment introduces a number of exemptions for the benefit of investors as stipulated in Article (20) of Law No 230 0f 1989 as shown below:

1. Investment projects enjoyed exemptions from the Company Establishment Law.
2. The number of board members was not limited, therefore according to this exemption projects were not bounded by a certain number of members of the board.
3. Exemption from the provision requiring the participation of employees in project management as stated by Article 82 of the Company Law

4. Exemption from the provision requiring a majority of Egyptians in management board as stated by Article 93 of the Company Law.

Additional exemptions that mentioned herein were only given as examples.

Among the factors which encouraged investors to invest in Egypt which were contained in Law 1144 of 2002 on investment were a number of tax exemptions granted to investors as shown below.

1. 15-year tax exemptions for housing projects. The exemption can be extended for another five years on the recommendation of Investment Board.
2. 10-year tax exemptions for project set up in new areas and new urban communities. This exemption can be extended for another two years on the recommendation of Investment Board.
3. Tax exemptions for already existing projects in order to increase their productivity which is covered by tax exemptions if the development and expansion were achieved.
4. 3-year tax exemptions for already existing projects in order to correct financial position according to the terms to be laid down by Investment Board.
5. Income tax exemption was made to encourage investment in corporations.
6. Tax exemption for land reclamation projects and for some project with special importance to Egyptian economy.

A brief exposition of the Egyptian legislations as mentioned above aims to attract Arab and foreign investment to Egypt. The investment was encouraged through several impetuses including guarantees and tax exemptions. All objectives and the legislator aims were analyzed and concluded from issuing Law 1144 of 2002 and the manner to realize them as follows**,**

PRESIDENTIAL. M. D, 2002.

The Egyptian investor was granted the same privileges as those granted to Arab and foreign investors.

1. The investor would have to deal with only one body through the newly established Board of Investment which was assigned to deal with all matters related to newly established or existing projects
2. Investment in the field of priority are encouraged and upheld.
3. The Egyptian legislator aimed to reduce unemployment and encourage investment which recruits a large number of employees
4. The Egyptian legislator aims to advanced management, technical, and technological systems.
5. Freeing the Egyptian economy from dependence of the public sector and directing towards privatization so that foreign investors would have confidence in Egyptian investors and thus they cooperate.
6. The Egyptian legislator aimed to reduce the deficit in the balance of payment**, Law No. 8 of 1997.**

These targets are reached from analyzing Law 1144 of 2002 which will be helpful to countries which intend to invest in developing countries.

2.10 Investment and its Objectives in Iraqi Law

The Iraqi Investment Law No. 13 was issued in 2006.The Iraqi Investment Law explained the advantages and guarantees for each investor and facilities for all investment projects in all sectors as follow:

The investor irrespective of his/her nationality shall enjoy all privileges, facilitations and guarantees and will be subject to the obligations stated in this law. The Iraqi and foreign investor shall have the right for, the purposes of housing projects, the use of the land for a sum to be determined between him and the land owner without land speculation according to conditions set forth by the National Commission for Investment and the approval of the Council of ministers.

The Commission will facilitate the allocation of the required lands for the housing projects. The housing units shall be allocated for ownership by the Iraqis after the completion of the project.
The factors which encouraged investors to invest in Iraq are as follows:

2.10.1 The project that has obtained an investment license from the Commission shall enjoy exemption from taxes and fees for a period of (10) ten years as of the date of commencing commercial operations in accordance with the areas of development defined by the Council of Ministers at the suggestion of the national commission for Investment based on the degree of economic development and the nature of the investment project.

2.10.2 The Council of Ministers shall have the right to propose draft laws to extend or grant exemptions in addition to the exemptions stipulated in paragraph (First) of this Article, or provide incentives, guarantees or other benefits to any project or sector or region and for the years and percentages it deems appropriate in accordance with the nature of the activity, its geographical location and its contribution to manpower employment and its effect on driving the economic development, and for considerations of national interest.

2.10.3 The National Commission for Investment has the right to increase the years of tax and fees exemption in a way directly proportional to the increase in the Iraqi Investor share in the project to reach fifteen years if the Iraqi Investor share in the project was more than 50%**, The Investment Iraqi law, 2006.**

2.11 Methods of Comparison between Projects

2.11.1 Economic Methods

The economic methods used in comparison vary depending upon the target of project which in turn varies with whether the project is public or private. With respect to public projects, comparison depends on some factors among which are**:**

2.11.1.1 The importance of the project in line with the national economy

Projects can be differentiated according to project importance to the national economy:

1. The importance of the project in economic development:
The importance of the project and its relation with economic development vary with the project nature, target and size. Industrial projects are typically more effective on national development than agricultural ones. Industrial projects in turn vary in importance and effect on national development. Heavy industries are more important than food or textile industries although all industries play a role in the increase in national income, productivity and employment

2. The importance of the project in national security:
Sometimes, economic and technical factors as well as the principle of profit and loss are overlooked in comparison in favor to security factor regardless the cost. For example a priority is usually given to an agricultural project for wheat production because wheat is considered as a strategic product and hence represents an important element in the nation security.

3. Project importance during use:
If creating job opportunities is regarded as one of main goals of development, then the authorities are responsible for planning to create a large number of new jobs through the use of certain quantity of the capital., In other words, it attempts to use the smallest amount of the capital necessary to provide new job opportunity.

2.11.1.2 The importance of the project in terms of balance of payment

Among the problems which must be looked into when comparing public sector projects is the effect on balance of payment through finding out the extent the proposed project depends on local raw materials or imported one. If the state policy is to curb the deficit in balance of payment, priority should be given to projects that depend on local services or to projects that produce imported goods or to projects that produce goods for export so that hard currency is obtained**, Nowak, Maciej, 2005.**

2.11.2 Technical Procedure

Establishing of large and modern projects not only help in developing staff's efficiency and skill but also help in changing traditional values and creates the spirit of investment and interest in setting up projects in the society. Also such projects can support the desire for improving living conditions and discipline at work, resulting in radical changes in pattern and principles of economic development.

2.11.3 Financial Procedure

In addition to comparing project based on economic and technical standards it is vital to carry out financial and audit comparison which involves calculation of cost, revenues, profit and net returns from money spent on the project. This is considered the main restriction on investment especially in private sector.

This research tackles investment projects in Iraq (housing sector) especially housing investment in Najaf Province. The map below shows the master plan of Najaf province.

3. CASE STUDY OF THE INVESTMENT REALITY AND HOUSING INVESTMENT PROJECTS DURING THE IMPLEMENTION

The housing project in Najaf Province executed in the time period from 2010 -2014. Data and information were obtained from Najaf Investment Commission and from Investment Companies which were carrying out the projects. The number of projects whose data were adopted is three housing projects. Below is a description of one sample shown table (2).

This research tackles investment projects in Iraq (housing sector) especially housing investment in Najaf Province.

3.1 Overview of Najaf Province

Najaf is a cultural, religious, commercial and agricultural center with area of 27.845 km^2. Its main cities are**, National Investment Commission, 2013.**

1. Najaf City
2. Kufa City
3. Al Manathera City

According to the Ministry of Planning, the population is between (2006-2020) and is shown in table (3).

3.2 Al- Hassan Investment Housing Projects

It is considered one of the important housing projects. The complex consists of (112) housing units in vertical buildings. Table (4) shows the building details. The project has very high technical specifications compatible with modern housing projects**, Najaf Investment Commission,2014 .**

3.1.1 Project Construction Stages

Al- Hassan Housing Project is service project financed by local and foreign investors as well as payments from prospective buyers because the units were sold out before the start of the project. Payment is paid in installments. The project is located in Al Manathera area in Najaf. It was planned to be completed within 24 months at a cost of (ID 11.647, 554,000) to be paid in two stages. The sums of stages are (ID 6.735, 000,000) and (ID 4.912, 554,000). The idea of the investor to complete the project in two stages is considered good as the investor will be able to reduce the amount he invests to half because at the end of the first stage he will be able to fund the second stage from the repayments from the first stage shown **Fig.2** investment license. The investor should carry out 70% of the housing complex infrastructure. But the project requirements should be prepared in full.

3.1.2 Specifying the Requirements and Preparation of Feasibility Study

3.1.2.1 Project Objective: Housing and real estate are considered as a fundamental sector in the economy all over world. In Iraq housing there is an urgent need for housing.

3.1.2.2 Project Description: Residential quarter and stores.

a. Houses more than (700) people with the necessary facilities.

b. Six shopping centers, a health care center, two primary schools and two secondary schools and health center, a kindergarten, a nursery and swimming pool.

3.1.2.3 Project justification: The Province stands in need of housing units to alleviate the housing problem.

Notes:

1. It does not need foreign experience nor imported raw materials. They are available in the local markets. The working days are 25 per month.
2. The project is to be completed within two years in two consecutive stages.

The project plot was received officially from Najaf Municipality on 05/03/2013 so that work could be completed within the specified time period and cost; after getting the license, the investor faced some problems among which are:

1. The complicated administrative measures in government departments especially in Najaf Municipality which result in delaying the completion of most housing projects by not proving the land for these projects.
2. The legal measures with Relics and Heritage Office as regards issuing a certificate the specified area does not contain relics
3. There are hurdles in the area represented by high tension poles and large water pipes.

3.1.3 Design and Preparation of Bills of Quantities (BOQ)

It's one of the important stages undergone by the project where was reflecting the basic needs of the project is in line with the modern with modern residential Complex.

As a consultant designed for schemes and the preparation of an initial bill of quantities as well as the contract with the consultant / University of Kufa office by the Provincial Council Resolution (17) in 2012 on the supervision, follow-up and receive the report of residential projects in the province at all stages of the project started on 10 /4/2013 and be responsible for the work because of its experience, a good reputation and rehabilitation. The firm providing engineering consultancy services for the project in three phases as follows:

3.1.3.1 Provide BOQ for construction works and project services (electrical, mechanical and health) and the actual proportions of achievement of each item.

3.1.3.2 By taking the test samples for materials used for residential project then give the results of the test and others count corresponding to international specification then re-examined again.

3.1.3.3 Daily general inspection on the progress of work at the site to secure the implementation of specifications, general designs then provide bi-monthly reports for the quality, the percentage of completion of each item and continue the process under the program for the implementation of 24 months.

3.1.4 The Investment Opportunity

Najaf Municipality advertised the project as an Investment Opportunity with area of (37,500 m^2)

A number of investors both local and foreign submitted their offers directly to the Investment Commission which checked them to find out their qualifications in terms of capability for the work, and their executive, financial, technical, and administrative abilities as well as their readiness to work within the specified time period. After the survey was completed, the license was awarded to Company.

3.1.5 Implementation

The execution style was done by general contractor method which the site has been contributed hand by hand to the contractor on 05/03/2013. The report recorded site location, advantages, limitations, the dimensions and constraints, real estate or signs or traces. The application of the time-table to examine all the items of implementation and functioning of each type of business is calculated theoretically. The plan would follow the imposition of labor, tools and materials are all equipped to work without interruption and crises fills in the site according to the effective functioning of the stages of implementation, work progress and steps under the supervision of engineer as well as the actual daily stop and delayed of construction such as materials, supplies, rainy days, holidays and emergency conditions. After the location have been taken then the preparing of the construction will start immediately by testing the soil to determine soil effort and bearing degree of soil surface pressure at a certain level loads, the contractor begins work by construction the overnight engineers and workers living sites then identify suitable locations for the raw materials storage and leaves enough space for the passage of motor vehicles which will supply raw materials of the site the Contractor shall take the necessary procedures to deliver water and electricity to the site. The researcher tried to record the most prominent obstacles and problems through in site study of the project, the Investment Authority, the project manager and site engineers in order to identify the problems which occur during the implementation, resulting from both the administration and planning in the first phase that precedes the implementation process and the following are some points:

1. When an investor for investment opportunity has been relying on the BOQ while this is not true of the fact that the real amounts vertebrae work is matching to the first phase, which applied to 70% the proportion of the infrastructure of the project is during the implementation period.
2. Work programs progress made by the investor are not dependable, because there is a difference between programs progress and the fact the port of residential project.
3. Despite the presence of a permanent contract between the investor competent laboratory tests, but the committee did not adopt these tests while investment correspondence immediate and pay wages at the same time, causing a waste of time, effort and reduces the interest point of the tests.
4. Delay from some directories approvals for the implementation of the project including the general department of housing, the municipality of Najaf, the General Authority for Antiquities and Heritage, Department of Education, Najaf Health directory, so provide all the paperwork for the project.

4. FIELD SURVEY

4.1 EVM performance analysis and forecasting

Table (5) shows what EVM performance measures indicate about a project in regard to its planned work schedule and resource budget. It will examine **Global standard, 2005**.

1. Variances: schedule variance (SV); (CV); and Variance at completion (VAC).
2. Indices: schedule performance index (SPI); cost performance index (CPI); to complete performance index (TCPI).
3. Forecasts: Time Estimate at completion (EAC t); Estimate at completion (EAC); and Estimate to complete (ETC).

From the basic three values three kinds of deviation can be calculated from the following equations, **PMI, 2011.**

Cost variance CV= EV - AC (1)

Cost performance index (CPI) = $\frac{EV}{AC}$ (2)

Schedule variance SV= EV -PV (3)

Schedule performance index (SPI) =$\frac{EV}{PV}$ (4)

where:
CV: Cost variance.
EV: Earned value.
AC: Actual cost.
CPI: Cost performance index.
SV: Schedule variance.
PV: Planned value.
SPI: Schedule performance index.

4.2Analysis of data information about the cost and time of housing projects

After data on the cost of project with the research sample was collected, their cost was analyzed by using earned value and illustrative drawing by using Sigma Plot program to find out the magnitude of deviation between the planned cost and planned percentage of performed work for every activity through the main three values of (planned, earned, and actual) after the Cumulative total is obtained as shown in Table (6), (7) results of calculation of basic values acquired by the percentage of completion. Tables (8) as well as the balance value set for the first stage of the project (BAC)**, Global, 2005.** The percentage of deviation in every housing project is shown in **Fig.3** with the estimated cost of planned work. The reduction in cost appears in the first stage of project. This is the difference between the planned value and actual cost. The percentage of the work performed for each project (27%) respectively. The amount of money spent is not compatible with planned cost. The reason for this is financing the project depends on the deposits which were drawn from the purchasers' monthly installments. Even so the investor cannot receive any money unless Investment Commission agrees and special committee decides on the project performed work.

4. 3 Cost variance (CV) and Cost performance indicator (CPI)

The ratio of deviation in cost is positive because it ranges between (6% - 22%) in table (5) and **Eq.** (1) and (2). This deviation is an example to show that the contractor had to wait for long time to get machinery or raw materials because they were unavailable at the time they were

needed, therefore the volume of work increased in general. The deviation shows less was spent than what was expected in the project, **Fig.4** Cost performance index of the project.

4. 4 Schedule variance (SV) and Schedule performance index (SPI)

It can be seen that time deviation (SV) is negative and ranges between ((-20) % - 16%) for project shown table (9) and **Eq.** (3) and (4). The survey has shown that among the major reasons for time deviation is the increase in work volume in some areas under study, making it difficult to get machinery and workforce, resulting in long wait to get them. Because of sudden stoppage in work either on order of Investment Commission being a representative of the Government in these buildings or because of security situation in addition, foundations cannot be cast without making sure of the accuracy of their reinforcement which the consultant or his representative should endure the compatibility of design with reality. This applies also to the project planning because reducing the period for items completion during project planning will certainly cause confusion in work.

Thus time performance index SPI is less than in project. The means that there is time delay from what is expected but the spending is less than what is expected on the work in project while the actual cost has exceeded what is planned in project, **Fig.5** is a graph of the time performance index for the first stage in housing project.

The estimated values of the remaining works (ETC) in housing project executed and from **Fig.6** graph of estimated value of the remaining works in project .The worst estimated value table(9) used **Eq.**(5),(6**) , Art Gowan,2006.**They were calculated by using the following equations.

$$\textit{Estimate To Complete (ETC1)} = \frac{BAC-EV}{CPI} \quad (5)$$

$$\textit{Estimate To Complete (ETC2)} = \frac{BAC-EV}{CPI*SPI} \quad (6)$$

Where:

ETC1: Estimate To complete (the most likely)

ETC2: Estimate To complete (the worst)

BAC: Budget At completion.

EV: Earned value.

CPI: Cost performance index.

SPI: Schedule performance index.

5. CONCLUSIONS

1. Prepare a dedicated staff of residents with experience in various engineering disciplines and who have extensive experience in their field of specialty.
2. The exchange of experiences between projects and programs through the data and information assessment, especially the rare cases of a failure of the project or implementation of the project as planned in absolute terms and for the purpose of benefiting from lessons learned from the projects implemented.
3. The issuance of legal legislation imposing the existence of evaluation systems for projects and accompany it to all stages of the implementation of the project.
4. In order to achieve the quality specifications of the housing project and get the project advanced degrees in the evaluation of the quality, the parties involved are characterized in the project competence and expertise needed to achieve those standards, and this was confirmed by the answers to the questionnaire categories through the granting of this factor is the degree of high importance.
5. weak role of supervision and follow-up on residential projects in the progress of work in residential projects as well as related activities oversight role in planning and guessing for business projects.

6. RECOMMENDATIONS

1. Reconsider manner hauling projects up costs and extended implementation.
2. The middle and senior management of the executive branch on the transfer of residential projects in accordance with the standards of good.
3. The need to apply strict supervision by supervisors during execution.
4. Focus on the receiving process to be procedures in advance and specific enough to ensure the lowest level allowed flaws and mistakes.
5. Development of laws relating to land acquisition and transfer of ownership.
7. Activating proliferation policy in the implementation of the residential cities to include all provinces.
8. Organizing efforts of the various agencies involved in housing activity and activation of coordination among them for future planning.
9. Inactive the tax system at the companies in the construction works.
10. Authentication board of investment plans and maps for residential projects before beginning construction work so as to avoid any failures and overlaps in business.

7. SUGGESTIONS FOR FUTURE STUDIES

1. Assessment of construction projects and their impact on long-term (value-added of the project).
2. A detailed study to assess the actual costs of the project and compare cost planned and the various phases of the project.
3. The adoption of modern concepts in the development of evaluation systems, as an application of neural networks in building evaluation systems.

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NOMENCLATURE

A= area, acre, m2, km^2.

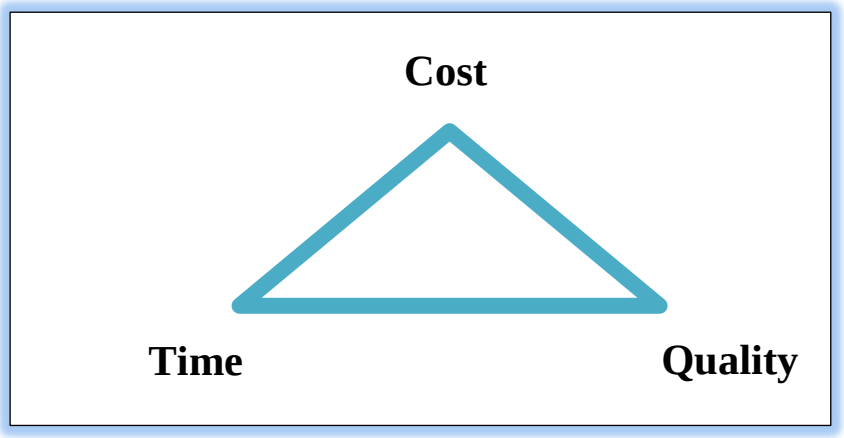

Figure 1. Success factors of project management.

Republic Of Iraq
Al-Najaf Investment Commission

جمهورية العراق
هيئة استثمار النجف الاشرف

إجازة إستثمار رقم (٦٤)
Investment License No. (64)

استناداً إلى الصلاحية المخولة لنا بموجب الفقرة (أ) من المادة (٧) والبند ثانيا من المادة (١٩) من قانون الاستثمار رقم ١٣ لسنة ٢٠٠٦ النافذ. وبعد الإطلاع على ما ورد في طلبكم وبعد إستحصال موافقة الجهات ذات العلاقة فقد قررت الهيئة منح الترخيص لحضرتكم بالإستثمار وعلى الوجه التالي :

In accordance with Article (7), paragraph (a) and Article (19), paragraph (first) within the Investment Law No.13/2006, and after favorable review of your request and after obtaining the approved of all concerned entities, the commission hereby grants a license to invest in the following project:

اسم المستثمر	Moufaq Kazim Abbas AL-Jewahiry	Name of investor
جنسيته	عراقي	Nationality
أسم المشروع	مجمع سكني	Project name
نوع الاستثمار	إسكان	Type of investment
رأس مال المشروع كتابة	خمسة مليار واربعمائة مليون دينار عراقي [written]	5.400.000.000 ID [typed] Project value
مدة تنفيذ المشروع	٢٤ شهر	24 months Project achievement period
الجهة المنفذة للمشروع	موفق كاظم عباس الجواهري	Moufaq Kazim Abbas AL-Jewahiry Project investment lead

تاريخ منح الترخيص: اليوم Day 6 الشهر Month 4 السنة Year 2010 Date of issuance:

رئيس هيئة استثمار النجف الأشرف / وكالة
By proxy/Chairman
Najaf Investment Commission

هيئة استثمار النجف رئيس الهيئة

م. سامر منهل / منتصر محمد . شرشام تحسين ٢٠١٠/٧/١١

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النجف الأشرف – حي الأمير – مقابل رئاسة جامعة الكوفة
Cell : + 964 219236 - 07601504342

Figure 2. Investment license.

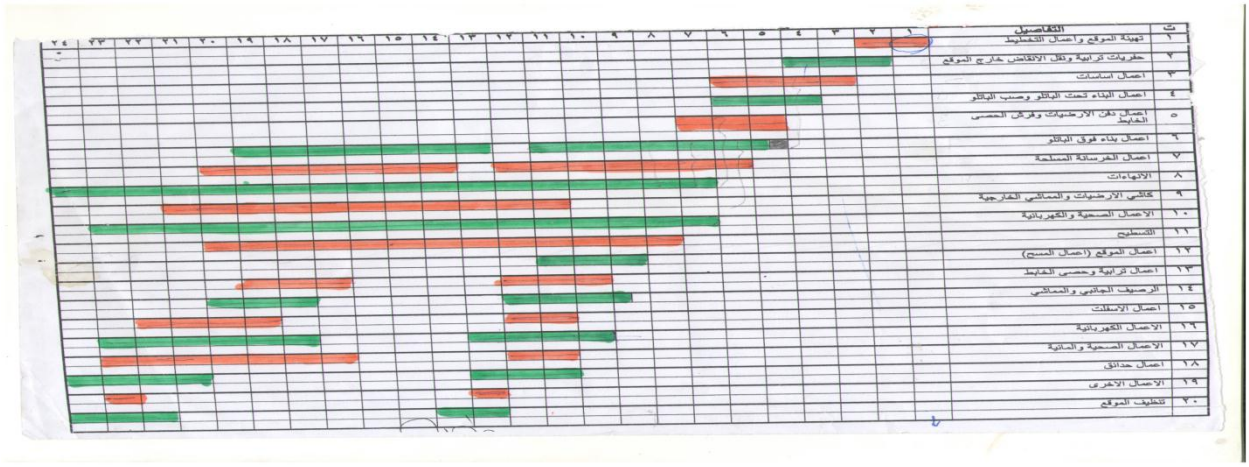

Figure 3. Provides work for the project

Figure 4. Main three values of (PV, EV, and AC) for the first housing project.

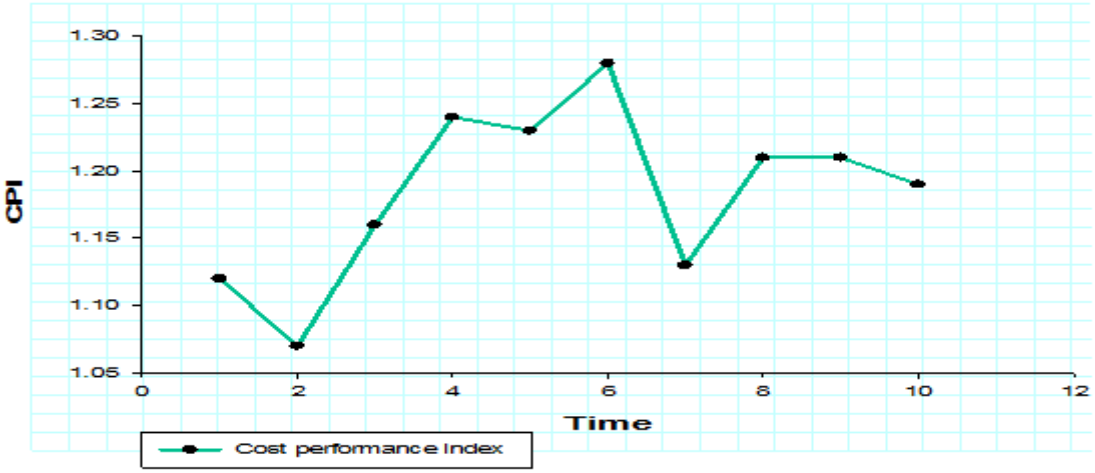

Figure 5. Cost performance index of the project.

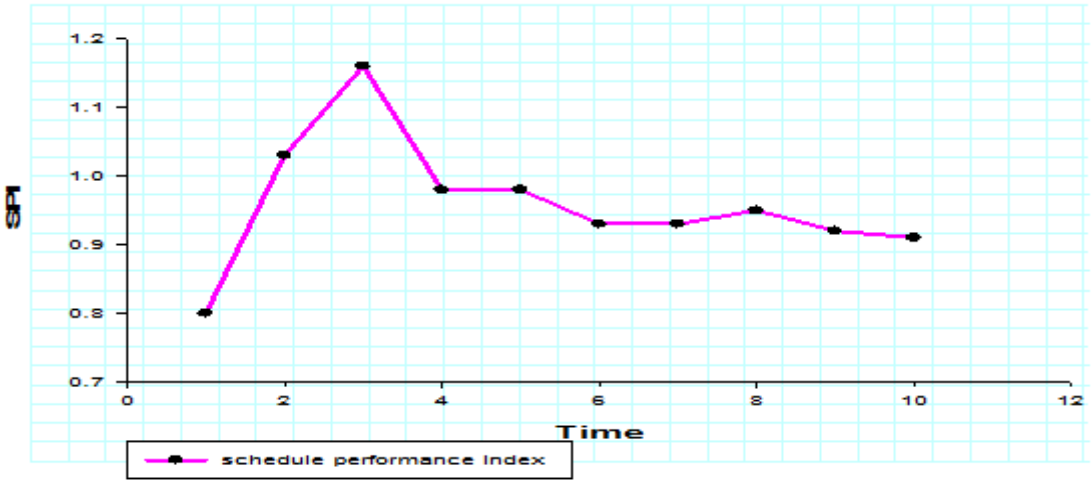

Figure 6. Schedule performance index for the first stage in housing project.

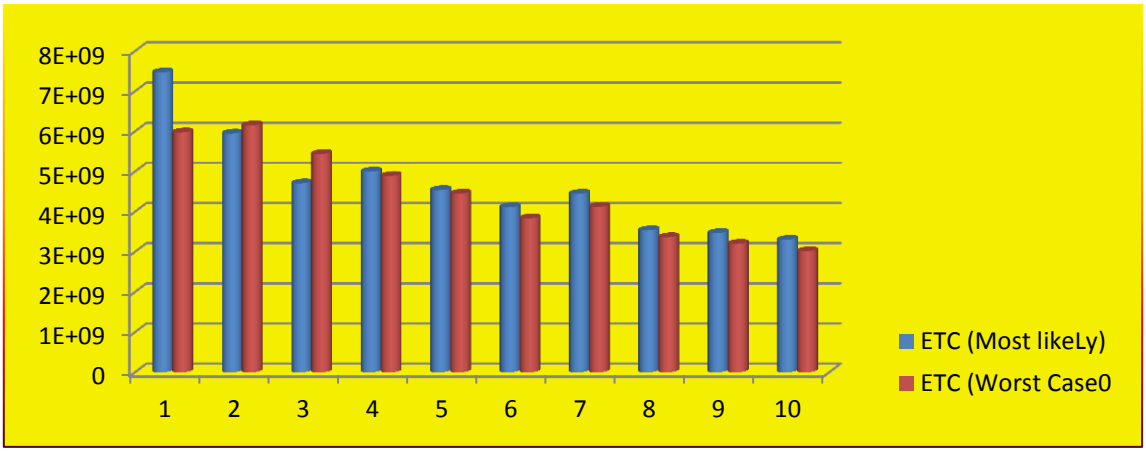

Figure 7. Graph of estimated value of the remaining works (ETC) in project.

Table 1. Reasons of project failure and the percentage of their effects.

Cause of Failure	Percentage of effect on project
Lack in integration of project requirement.	13.1%
Opinion of project users is not considered	12.4%
Insufficient resources	10.6%
Unrealistic estimations	9.9%
Inefficient administrative support	9.3 %
Changing in requirements	8.7%
Poor planning	8.1%
Real need is not well estimated	7.4%

Table 2. Description of research sample.

Project	NO. unit	Building material type	Cost ID	Investment License NO.	Achievement period	Achieved rate	Area	Date started	No of laborers. Local & foreign
Hussein complex	112	Traditional building	11,086,020,000	2010/4/6 (64)	24 MONTH	%27	15 acre	/2/18 2013	%100 Local

Table 3. Showing the population between (2006-2020) in Najaf.

Year	Population
2006	1, 081, 210
2010	1,204,730
2020	1,574,201

Table 4. The type of building, number of units and built area.

Type	Area	No. Unit	Unit area	Floor area			Building area
				Ground	1st	Total	
A	250	38	9,500	177	31	208	7,904
B	250	38	9,500	177	0	177	6,726
C	200	18	3,600	138	33	171	3,078
D	200	18	3,600	138	0	138	2,484
						SUM	20,192

Table 5. Interpretations of Basic EVM performance Measures.

Performance Measures		Schedule		
		SV>0 & SPI>1.0	SV=0 & SPI = 1.0	SV<0 & SPI< 1.0
Cost	CV > 0 & CPI > 1.0	Ahead of schedule under Budget	On schedule under Budget	Behind schedule under Budget
	CV = 0 & CPI = 1.0	Ahead of schedule on Budget	On schedule on Budget	Behind schedule on Budget
	CV < 0 & CPI < 1.0	Ahead of schedule over Budget	On schedule over Budget	Behind schedule over Budget

Table 6. The results of calculation of basic values acquired by the percentage of completion.

Measurement Time	Activity	Baseline Data			Performance Data		Actual Cost	
		% Complete	Budget Cost	PV (BCWS)	% Complete	EV (BCWP)	Actual Cost	AC (ACWP)
MONTH (1)	A	50%	85560000	42780000	40%	34224000	76308000	30523200
Accumulative				42780000		34224000		30523200
MONTH (2)	A	100%	85560000	85560000	90%	77004000	76308000	68677200
	B	33.3%	195660000	64567800	40%	78264000	191263000	76505200
Accumulative				150127800		155268000		145182400
MONTH (3)	A	100%	85560000	85560000	100%	85560000	76308000	76308000
	B	66.6%	195660000	129135600	80%	156528000	191263000	153010400
	C	25%	550000000	137500000	30%	165000000	402165000	120649500
Accumulative				352195600		407088000		349967900
MONTH (4)	A	100%	85560000	85560000	100%	85560000	76308000	76308000
	B	100%	195660000	195660000	90%	176094000	191263000	172136700

	C	50%	550000000	275000000	45%	247500000	402165000	180974250
	D	33.3%	455952000	150464160	40%	182380800	325952000	130380800
Accumulative				706684160		691534800		559799750
MONTH (5)	A	100%	85560000	85560000	100%	85560000	76308000	76308000
	B	100%	195660000	195660000	100%	195660000	191263000	191263000
	C	75%	550000000	412500000	60%	330000000	402165000	241299000
	D	66.6%	455952000	300928320	75%	341964000	325952000	244464000
	E	33.3%	501490000	165491700	35%	165491700	381490000	133521500
	F	7%	1688800000	118216000	8%	135104000	1647800000	131824000
Accumulative				1278356020		1253779700		1018679500
MONTH (6)	A	100%	85560000	85560000	100%	85560000	76308000	76308000
	B	100%	195660000	195660000	100%	195660000	191263000	191263000
	C	100%	550000000	550000000	80%	440000000	402165000	321732000
	D	100%	455952000	455952000	90%	455952000	325952000	293356800
	E	66.6%	501490000	330983400	75%	376117500	381490000	286117500
	F	14%	1688800000	236432000	12%	202656000	1647800000	197736000
	G	7%	1706738000	119471660	5%	85336900	1542481000	77124050
Accumulative				1974059060		1841282400		1443637350
MONTH (7)	A	100%	85560000	85560000	100%	85560000	76308000	76308000
	B	100%	195660000	195660000	100%	195660000	191263000	191263000
	C	100%	550000000	550000000	90%	495000000	402165000	361948500
	D	100%	455952000	455952000	100%	455952000	325952000	325952000
	E	100%	501490000	501490000	90%	451341000	381490000	343341000
	F	21%	1688800000	354648000	20%	337760000	1647800000	329560000
	G	14%	1706738000	23894220	12%	20480760	1542481000	185097720
	H	5.5%	1550800000	85294000	3%	46524000	1317811000	39534330

Accumulative				**2252498220**		**2088277760**		**1853004550**
MO (NTH 8)								
	A	**100%**	**85560000**	**85560000**	**100%**	**85560000**	**76308000**	**76308000**
	B	**100%**	**195660000**	**195660000**	**100%**	**195660000**	**191263000**	**191263000**
	C	**100%**	**550000000**	**550000000**	**95%**	**522500000**	**402165000**	**382056750**
	D	**100%**	**455952000**	**455952000**	**100%**	**455952000**	**325952000**	**325952000**
	E	**100%**	**501490000**	**501490000**	**95%**	**476415500**	**381490000**	**362415500**
	F	**28%**	**1688800000**	**472864000**	**25%**	**422200000**	**1647800000**	**411950000**
	G	**21%**	**1706738000**	**358414980**	**20%**	**341347600**	**1542481000**	**308496200**
	H	**11%**	**1550800000**	**170588000**	**10%**	**155080000**	**1317811000**	**131781100**
Accumulative				**2790528980**		**2654715100**		**2190222550**
MONTH (9)	**A**	**100%**	**85560000**	**85560000**	**100%**	**85560000**	**76308000**	**76308000**
	B	**100%**	**195660000**	**195660000**	**100%**	**195660000**	**191263000**	**191263000**
	C	**100%**	**550000000**	**550000000**	**100%**	**550000000**	**402165000**	**402165000**
	D	**100%**	**455952000**	**455952000**	**100%**	**455952000**	**325952000**	**325952000**
	E	**100%**	**501490000**	**501490000**	**100%**	**501490000**	**381490000**	**381490000**
	F	**35%**	**1688800000**	**591080000**	**29%**	**489752000**	**1647800000**	**477862000**
	G	**28%**	**1706738000**	**477886640**	**23%**	**392549740**	**1542481000**	**354770630**
	H	**16.5%**	**1550800000**	**255882000**	**13%**	**201604000**	**1317811000**	**171315430**
Accumulative				**3113510640**		**2872567740**		**2381126060**
MONTH (10)	**A**	**100%**	**85560000**	**85560000**	**100%**	**85560000**	**76308000**	**76308000**
	B	**100%**	**195660000**	**195660000**	**100%**	**195660000**	**191263000**	**191263000**
	C	**100%**	**550000000**	**550000000**	**100%**	**550000000**	**402165000**	**402165000**
	D	**100%**	**455952000**	**455952000**	**100%**	**455952000**	**325952000**	**325952000**
	E	**100%**	**501490000**	**501490000**	**100%**	**501490000**	**381490000**	**381490000**
	F	**42 %**	**1688800000**	**709296000**	**40%**	**675520000**	**1647800000**	**659120000**
	G	**35%**	**1706738000**	**597358300**	**25%**	**426684500**	**1542481000**	**385620250**

	H	22%	1550800000	341176000	16%	248128000	1317811000	210849760
Accumulative				3436492300		3138994500		2632768010

Table 7. Values of the acquired values, with values related in cost deviation.

Month	Baseline Metrics Measurement Cumulative			Cost variance			BAC
	PV	EV	AC	CV	CV%	CPI	
				EV-AC	CV/ EV	EV/ AC	
1	42780000	34224000	30523200	3700800	11%	1.12	6735000000
2	150127800	155268000	145182400	10085600	6%	1.07	6735000000
3	352195600	407088000	349967900	57120100	14%	1.16	6735000000
4	706684160	691534800	559799750	131735050	19%	1.24	6735000000
5	1278356020	1253779700	1018679500	235100200	19%	1.23	6735000000
6	1974059060	1841282400	1443637350	397645050	22%	1.28	6735000000
7	2252498220	2088277760	1853004550	235273210	11%	1.13	6735000000
8	2790528980	2654715100	2190222550	464492550	17%	1.21	6735000000
9	3113510640	2872567740	2381126060	491441680	17%	1.21	6735000000
10	3436492300	3138994500	2632768010	506226490	16%	1.19	6735000000

Table 8. Deviations show cost, time and overall performance index.

Month	EV deviation				EV Index	
	SV	CV	SV%	CV%	SPI	CPI
	EV-PV	EV-AC	SV/PV	CV/EV	EV/PV	EV/AC
1	-8556000	3700800	-20%	11%	0.80	1.12
2	5140200	10085600	3%	6%	1.03	1.07
3	54892400	57120100	16%	14%	1.16	1.16
4	-15149360	131735050	-2%	19%	0.98	1.24
5	-24576320	235100200	-2%	19%	0.98	1.23
6	-132776660	397645050	-7%	22%	0.93	1.28
7	-164220460	235273210	-7%	11%	0.93	1.13
8	-135813880	464492550	-5%	17%	0.95	1.21
9	-240942900	491441680	-8%	17%	0.92	1.21
10	-297497800	506226490	-9%	16%	0.91	1.19

Table 9. Remaining business value (ETC) in the project each quarter for estimating the most likely, and estimate the worst for the Estimate to complete of project

Month1	Estimate To Complete ETC		To Complete Performance Index TCPI (BAC)
	1	2	
1	5976189984	7470237480	1.00
2	6152338429	5948663170	1.00
3	5440018065	4706477288	0.99
4	4892205437	4999378324	0.98
5	4453419332	4540714300	0.96
6	3836865821	4113545938	0.92
7	4123205073	4447450557	0.95
8	3366361987	3538583361	0.90
9	3201643596	3470188453	0.89
10	3016076723	3301925006	0.88