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THE ECONOMICAL AND FINANCIAL PLANNING FOR LARGE ARCHITECTURAL AND URBAN PROJECTS PROPOSED METHODOLOGICAL MODEL

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ABSTRACT
Nowadays, the governments are suffering from the problem of how to satisfy the balance between the planning strategies, of large projects, and the limitations of the financial resources and strategies, which is strongly rised due to the recent international circumstances and the limitation of resoùs. This study introduces the outlines of a proposed methodological model, aiming at conciliating financial and planning strategies of large construction projects. The main task of the research work had been developed and accomplished by the researcher during the preparion and configuralion of such comprehensive financial and planning strategies for King Khalid University, K.S.A, in .The researcher, according to the proposed methodology, configured and prepared all the financial and planning strategies for the above large project as field application.

تقدم هذه الورقة البحثية الخطوط الرئيسية لمنهجية مقترحة تم تطويرها وصياغتها بواسطة الباحث لتناول إشكالية التوافق بين التخطيط الاقتصادي والتمويلي للمشروعات المعمارية والعمرانية الكبرى وبين متطلبات التنمية المستدامه والاحتياجات الفراغية والعمرانية لهذه المشروعات وخاصة في مرحلة إعداد دراسات الجدوى الاقتصادية والبرنامج المعماري الأولي للمشروعات الكبرى. ومن ثم تقدم هذه الدراسة نموذجا مقترحا لتحليل التكلفة للمشروعات المعمارية والعمرانية باستخدام طريقة تحليل وحدة التكلفة بناءا على تحليل البرنامج المساحي والوظيفي المقترح والذي يعكس المتطلبات التنموية المطلوبة. كما تقدم هذه الدراسة أيضا نموذجا تفصيليا يصف الأنساق العملية المحتملة للعلاقة بين المتطلبات الوظيفية والاحتياجات الفراغية من جهة وبين القيود المالية والتمويلية من جهة أخرى وذلك من خلال تحديد خصائص وظروف كل احتمال أو نسق والطرق الرياضية والمالية للتوفيق بين المتطلبات الحيوية والإمكانات المالية والتمويلية . وقد تم صياغة وتطوير مجموعة من المعادلات الرياضية والمالية بواسطة الباحث لتربط بين المتطلبات الوظيفية والمساحية والفراغية للبرنامج المعماري المقترح للمشروع من جهة وبين الأسس والمفاهيم والإمكانيات المالية والتمويلية المتاحة. كما تقدم هذه الدراسة تطبيقا عمليا للمنهجية المقترحة من خلال إعداد التصور المتكامل بين الخطط التمويلية والمالية من جهة ومتطلبات التصميم والبرنامج الوظيفي وخطط التنفيذ على مراحل من جهة أخرى لمشروع تصميم جامعة الملك خالد بأبها بالمملكة العربية السعودية خلال عام ٢٠٠٤ .

Keywords: Financial Strategy- Planning Strategy- Value Engineering- Feasibility Studies

1. INTRODUCTION: Problem Identification

The governments face and manipulate the conflict between the planning strategies, which reflect the requirements of both the society and the sustoinable development, and the financial strategies, which are usually limited especially in case of developing countries, in different manners, depending an the nadure of the real problens policies. Whatever the polices used to conciliate between both the planning and financial strategies they should be proposed and introduced in a harmonic comprehensive manner in order to accomplish the project under consideration. The ultimate purpose is to satisfy the requirements of the society through the most pest functionality with the lowest construction cost.

Virtually, the traditional trends of feasibility studies for the architectural and urban large projects cannot effectively face the challenge of how to satisfy the requirements of the continuous development with the scarcity of resources and limited finances available. Even though several recent trends and fields are suggesred to deal with this problem, Value Engineering trend is instituted and introduced as the most effective and comprehensive methd in dealing with the wide economic-planning problems. The Value Engineering field concerns with the is combination between both financial and planning aspects [1].

Since 1957 the methods, technology and application of Value Engineering (VE) has greatly developed and exparded. Value Engineering is sometimes referred to as Value Control, Value Improvement or Value Assurance. It can also be applied wherever cost and/or performance improvement is desired. That improvement can be measured in terms of monetary aspects and/or other critical factors such as productivity, quality, time, energy, environmental impact and durability [2]. Value Engineering must be applied as early in the design cycle as feasible to achieve the maximum benefits. Changes or redirection of design can be accomplished without extensive redesign, large implementation cost, and schedule impacts [3]. The ultimate purpose – in case of the large construction projects- is how to satisfy the most efficient functional performance with the appropriate cost and how the clients or governments use effectively their limited financial resources in ideal manners to achieve the most possible benefits within the sustainsble development.

The interrelationship between financial and planning strategies is the subject of so many contentions because of the natural conflict between the requirements of the sustaoinsble development and the limitation of financial abilities [4, 5]. This study is based on real extensive attempts to constitute such a comprehensive model not only for estimating the construction cost but also for matching the financial and planning strategies. This is accomplished by selecting and developing the consistent cost analysis technique in the early design process. Hence, the proposed model of the cost unit analysis is introduced by this study aiming at determining the average cost / m2 for the project on which all the cost estimation processes will be based in later stages. In addition, this study presents another proposed model aimed at describing all the applicable patterns of interrelationships between the financial and planning strategies. All the mathematical formulas, which are used here, are developed based on the general financial formulas by the researcher, to be suitable for the problem under consideration.

The ultimate purpose of any fruitful research work should handle the practical problems, not only to diagnose the characteristics of such a problem, but also to propose the consistent applicable solutions. Virtually, the research topics should be oriented to address the real acute problems. From this point of view, the need for drawing and constituting comprehensive financial and planning strategies for the project of King Khalid University at K.S.A, satisfying the most effective performance within the limited budgets, more extensive research work. Then, reeded this study, is accomplished by the researcher who works as the senior design architect of the tasks of cost analysis and financial and planning strategies as well as space programming in the project under consideration. The proposed methodological models with the developed mathematical formulas are configured as a general methodology whereas it deals with a special case study, i.e. King Khalid University.

2. COST UNIT ANALYSIS: A Proposed Model

Cost unit analysis is one of the most efficient and prominent methodological models on which the cost analysis and feasibility studies of large design projects could be based especially in the early stages of design process [2, 6]. How to draw a concrete real financial strategy dealing only with the architectural space program is the target of this stage of cost analysis process. In the early design process where there are no complete design descriptions and specifications, it is impossible to calculate an accurate construction cost for the project under consideration. Then, the method of cost unit analysis could play an efficient role in dealing with the early stages of the design process of large projects. The method of cost unit analysis is mainly based on both the analysis of the detailed space program and the assumptions about the construction and finishing materials that will be used in a later stage of the design process.

The main goal of the cost unit analysis is, generally how to designate the average construction cost per meter square for a certain project. Then, it will be easy to calculate the capital construction cost for the project under consideration by multiplying the total gross area times the average cost /m2. This is the basic formula on which all the financial strategies could be based in later stages. To accomplish this task, two essential subtasks should previously be satisfied and handled. The first is the detailed architectural space program incorporating a concrete description about not only the design components and activities within the project, but also the relevant areas and spatial requirements as well as the number of spaces for each activity. Then, this task provides the analytical model with all the necessary information about the areas and number of spaces for each activity within the project. The second is the database of the average prices of construction materials and the cost of implementing construction works under different circumstances.

In fact, there are several different technical methods to handle the cost unit- analysis task [1, 2]. This study proposes an efficient technique based on classifying the capital construction cost into two different types for any activity. The first type is the constant construction cost while the second type is the variable one. The constant construction cost does not depend on the area, quality of space or number of spaces for the activity under consideration, while the variable construction cost on the variable construction specific items. For example, the cost of the concrete and foundations is mainly distributed on the total area of the project while the cost of painting is variable according to the quality of space. Hence, it is helpful to calculate both the constant and variable construction costfor each activity in order to determine the average cost /m2 for each activity.

The proposed model of the cost unit analysis is introduced by this study aiming at determining the average cost / m2 for the project, Figure 1. The first step is to determine the average cost per meter square for a certain important activity as a reference, and assume that its relative cost equals on as a reference cost unit. According to the first assumption, the cost unit (CU) should be calculated for each activity as a ratio between the average total cost /m2 of the activity under consideration and that of the reference specific activity. For Example, in case of college design, assuming that the "classroom" is selected as the reference activity, its average cost/m2 is estimated as 2000 pounds, and the average cost /m2 for the physical laboratory is 3000 pounds. Then, it is helpful to assume that the cost unit (CU) of "classroom" is equal (1) and accordingly the (CU) for the physical laboratory could be calculated as (1.5). Hence, the present cost unit value, PV (CU), could be defined as the present value of the cost unit of the reference activity. In the above example, the PV (CU) equals 2000 pounds.

The second step in the cost analysis task is to calculate the Relative Cost Units (RCU) for each activity. The Relative Cost Units (RCU) could be defined as the relative total number of cost units for a specific activity. It could be calculated using the following formula:

RCU (i) = CU (i) * Total Area (i)

Where:
RCU (i) : relative cost unit for activity (i).
CU (i : cost unit for activity (i).
Total Area (i): total net area for activity (i).

It is easy now to calculate the total average cost of the activity under consideration by multiplying the RCU time the PV (CU). In the above example, if the total area of the physical laboratories equals 200 m2, the RCU should be equal to 300 cost units. Moreover, the total cost of the physical laboratories equals 600,000 pounds as a present value.

The third step is to calculate the Total Relative Cost Units (TRCU) for the project as a summation of all the RCU of the different activities. This is accomplished by using the following formula:

TRCU = Σ RCU n (n=1 to m)

The General Cost Unit per meter square (GCU) could play an important role in the cost analysis studies because each type of project and building could have a specific GCU under normal circumstances. It is helpful to use the appropriate value of GCU in cost analysis studies whenever there is a lack in the information of the space program. The General Cost Unit per meter square (GCU) for the project as a present value is essentially determined using the following formula:

GCU = Total Project Gross Area / TRCU

The Total Capital Cost could be now calculated using the following formula:

Total Capital Cost = TRCU * PV (CU)

Finally, the Average Cost / m2 as a present value for the project under consideration could be determined using the following formula:

Average Cost (PV) / m2 = Total Capital Cost / Total Gross Area

If the GCU and PV (CU) are available for the specific type of project while there is still no other information about the total gross area of the project under consideration, it is helpful to use the following formula to calculate the average cost / m2 as a present value:

Average Cost (PV) / m2 = GCU * PV (CU)

Conceptually, the total capital cost and the average cost /m2 for the project are imperative issues on which both the financial and planning strategies could be based in a later stage. It is fruitful to extract an important formula from the two previous formulas of calculating the capital cost of the project as follows:

Total Capital Cost = TRCU * PV (CU)
Total Capital Cost = GCU * PV (CU) * Total Gross Area
Then:

TRCU = GCU * Total Gross Area

The above formula could play a useful role in the cost analysis studies whenever the information of the space program is absent or still under consideration. Hence, if we have the GCU of the project type and the maximum total gross area of a particular project as a design target, it is possible to calculate proximately the TRCU without needing for the space program analysis.

3.FINANCIAL AND PLANNING STRATEGIES: The Alternative Patterns

The economic planning for a large architectural and urban project could be accomplished by matching both the architectural planning strategies and the financial strategies, subject to the limitations and constraints. Principally, economic planning procedure should be established in the early stages of the planning process. For this reason, this task becomes more sophisticated because it depends on such expectations. All these expectations should be extracted by applying a set of coherent strategies and financial formulas.

The study proposes a simple model for the main components of the economic planning procedure, Figure 2. The variables incorporated within this proposed simple model could be characterized in the following items:

1. The proposed project with its appropriate size in the form of space program.
2. The area available to be yearly implemented within a coherent phasing strategy.
3. The total number of implementation years required to accomplish the proposed project.
4. The capital cost required for project implementation. Obviously, it depends on the size of the proposed project.
5. The annual budgets provided by the financial resources, clients or governments. The annual budgets could be equals or varied. Furthermore, annual budgets could be initially determined by the client or the government within a comprehensive financial strategy or could be designated according to the planning and phasing strategy of the project and functional requirements.
6. The Interest rate or / and inflation.

Ally, all the components of the proposed model constitute two different types of strategies. The first type is the planning strategy while the second type is the financial strategy. Planning strategy considers mainly the technical issues while the financial strategy considers the financial ones. Planning strategy not only determines the relevant space program of the project but also configures the main phasing strategy in view of the functionality and the hierarchal requirements. Hence, how the total area and different activities of the project under consideration could be distributed into certain number of phases is the main goal of the phasing strategy. Financial strategy determines the budgets required to accomplish the proposed project within a limited time.

Practically, it is imperative to avoid any discrepancy or conflict between the planning strategy and the financial strategy in order to accomplish the project. Then, the interrelationships between the planning and financial strategies should be considered in more anatomic viewpoint. It is useful to looking for the various alternatives of this relationship according to the priorities and requirements.

Generally, only one of these strategies should play the dominant role in this vital design stage. Planning strategy could be dominant if the project itself is so important and required to be implemented apart from its cost. In this case, the planning strategy configures the space program according to the essential requirements and formulates the relevant phasing strategy according to the functionality and vital needs, ignoring any financial regulations. Hence, the financial strategy should be accordingly configured to satisfy the requirements of the planning strategy. The capital cost with its annual budget must be allowed and provided by the client or government. On the other hand, financial strategy could be the pilot. A mostly, the government designates certain capital costs or / and annual budgets, as financial regulations, for the projects under consideration. Within these cases, the pre-decided capital cost or / and the determinant annual budget affect the planning strategy of the project. Actually, the amount of areas, the space program, the magnificence of finishing materials, and the phasing strategy should be drawn according to the pre-stated financial strategy.

Practically, it is helpful to define five different patterns according to the proposed model, Figure 2. Two of these patterns could be classified as planning strategies while the others could be classified as financial strategies. All the mathematical formulas, which are used here, are developed based on the general financial formulas by the researcher, to be suitable for the scope under consideration.

<u>The first pattern of the planning strategy</u> is based on planning polices. The main dominant orientation, according to this pattern, is based on the planning requirements and design conceptions. Sometimes, for example, the government needs a certain project irrespectire of its cost in order to satisfy some urgent and vital social, political or other purposes. The main concept is that phasing strategy is actually configured with detailed planning tasks and areas required to be implemented, yearly according to some urgent requirements. Hence, the ultimate purpose is to determine the annual budgets required to satisfy the given planning strategy. Furthermore, the annual budgets should be varied according to the areas required to be implemented during the different phases. Besides, the capital cost should be also calculated as a present value. This task could be accomplished through three steps. The first step is how the average cost /m2 is calculated as future values for each implementation phase, using the following formula:

$$\text{Average Cost (FV)} / m2 = \text{Average Cost (PV)} / m2 * (1 + R)^a$$

where:

R : The interest rate

a : The number of implementation years

The second step is to calculate the budgets required for each implementation phase or year by using the developed formula:

Annual Budget required for phase (K) = Area (K) * Average cost (K) /m2

Finally, in order to designate the capital cost as a present value, it is helpful to use the following formula:

Capital Cost (PV) = Total Area* Average Cost (PV) /m2

<u>The second pattern of the planning strategy</u> is also based greatly on the planning requirements apart from the capital cost and the values of budget required. First, the project size is determined according to a comprehensive detailed space

program. Second, number of implementation years is also provided according to the need for the project and its importance. Third, the capital cost could be calculated and given as a present value. The goal is to designate the annual budget required to accomplish the important proposed project under consideration. Accordingly, the amount of areas available to be yearly implemented is also determined to formulate a coherent and concrete phasing strategy for the project. In order to accomplish this task, four, steps should be takon. The first step is to calculate the constant annual budget required by using the following developed formula:

$$AB\ (FV) = Capital\ Cost\ (PV) * \frac{(1+R)^a * R}{(1+R)^a - 1}$$

Where:
AB (FV) : Annual Budget (FV)
R : The interest rate
a : The number of implementation years

The *second step* is to determine the average cost / m2 as a present value by using the following simple formula:

$$Average\ Cost\ (PV)\ /m2 = \frac{Capital\ cost\ (PV)}{Total\ Area}$$

The third step is to determine the average cost / m2 as a future value for each year by using the following developed formula:

Average Cost (FV) / m2 = Average Cost (PV) /m2 * $(1 + R)^a$

The fourth step is to calculate the area available to be yearly implemented. The following developed formula could be efficiently used to accomplish this step:

A (K) = Annual budget (K) / Average cost/m2 (K)

Where A (K): Area Available to be implemented during phase (K)

<u>The first financial pattern</u> is one of the famous governmental financial policies especially in the developing countries where the resources are limited. In this case, the government determines appropriate annual budgets for each project under consideration according to the financial abilities available, as well as, the primitive feasibility studies for these projects. Then, the financial strategy for the project determines pre-supposed constant value for the annual budget during a specific number of years to accomplish a particular project. The goal is to propose the relevant size of that project. Then, the proposed space program should comply greatly with the given value of the annual budget. Hence, the phasing strategy, which described the area available to be yearly implemented, should be also decided according to the stated annual budget. To accomplish this, three steps should be handled. The first step is to calculate the total area available for the project according to its budget, using the following developed formula:

$$Total\ Area = \frac{AB\ (FV)}{AC\ (PV)} * \frac{(1+R)^a - 1}{(1+R)^a * R}$$

Where:
AC (PV) : Average Cost (PV) /m2
AB (FV) : Annual Budget (FV)
R : The interest rate
a : The number of implementation years

The second step is to calculate the average cost /m2 as future values, using the following developed formula:

Average Cost (FV) / m2 = Average Cost (PV) /m2 * $(1 + R)^a$

The third step is to calculate the area available to be yearly implemented. The following developed formula could be used to accomplish this step:

A (K) = Annual budget (K) / Average cost/m2 (K)

Where:
A (K): Area Available to be implemented during phase (K)

<u>The second financial pattern</u> is so effective in satisfying such a balance between the limitation of the financial resources and the important planning requirements within the continuous development. In case that the project size is essentially required as it is, without any reduction to meet the stated capital cost and pre-determinate annual budget for the project under consideration, the number of implementation years could be taken as a *variable*. The ultimate purpose is to determine the appropriate number of implementation years required to accomplish the important project with its size and areas, using the available stated capital cost and annual budget decided before. Accordingly, it is essential also to configure the consistent phasing strategy with the area available to be yearly implemented in order to complete the comprehensive planning strategy and space program. In order to calculate the number of implementation years required to accomplish the project, it is helpful to use the following formula developed by the researcher:

$$N = \frac{Ln\ \{Ab/\ (Ab - R * Capital\ cost\ (PV))\}}{Ln\ (1 + R)}$$

Where:
N: Number of implementation years
Ab: Annual budget

The second step is to determine the average cost / m2 as a present value by using the following simple formula:

$$Average\ Cost\ (PV)\ /m2 = \frac{Capital\ cost\ (PV)}{Total\ Area}$$

The third step is to determine the average cost / m2 as a future value for each year by using the following developed formula:

$$\text{Average Cost (FV)} / m2 = \text{Average Cost (PV)} /m2 * (1 + R)^a$$

The fourth step is to calculate the area available to be yearly implemented. The following developed formula could be used to accomplish this step:

A (K) = Annual budget (K) / Average cost/m2 (K)

Where:

A (K): Area Available to be implemented during phase (K)

<u>The third financial pattern</u> is also very effectual strategy. This pattern could be handled in case that the government, for example, determines such a stated annual budget through a certain number of years for the project according to specific developing planning strategy, as well as, the project under consideration is required to be implemented with its proposal size and areas to meet a set of different requirements. In this special case, the given annual budget and number of years affect dramatically the quality of project spaces if the project size had been formulated before according to the vital requirements apart from any financial orientations. Then, the average cost per meter square is directly affected because both the total area and the annual budget of the project are given as limitations. Average cost /m2 as a present value could be calculated using the following formula developed by the researcher:

$$AC (PV) = \frac{AB (FV)}{\text{Total Area}} * \frac{(1+R)^a - 1}{(1+R)^a * R}$$

Where:

AC (PV): Average Cost (PV) /m2

AB (FV): Annual Budget (FV)

R: The interest rate

a: The number of implementation years

Average cost /m2 as future values and the capital cost could be calculated using the following developed formulas:

$$\text{Average Cost (FV)} / m2 = \text{Average Cost (PV)} /m2 * (1 + R)^a$$

$$\text{Capital Cost (PV)} = \text{Total Area} * \text{Average Cost (PV)} /m2$$

Then, the area available to be yearly implemented could be finally determined by the following formula:

A (K) = Annual budget (K) / AC (PV)

Where:

A (K): Area Available to be implemented during phase (K)

AC (PV): Average Cost (PV) /m2

4. THE ROLE OF FINANCIAL AND PLANNING STRATEGIES IN THE DESIGN DECISIONS

Phasing strategies are the main purposeful results from the combination of both the financial and planning strategies [7,8]. Phasing strategies describe all the sequential implementation phases needed to establish the project according to specific budgets as future values. Conceptually, four different tasks could be actually affected by the structure of the phasing strategy [8]: (1) Space Program, (2) Design Concept, (3) Financial Strategies, and (4) Construction Implementation Strategies.

The Space Program task is configured in the latest version according to the phasing strategy. In fact, two main issues affect the phasing strategies: (1) Cost Analysis and (2) Client's Requirements. The Cost Analysis task calculates the capital construction cost required for the project implementation. Furthermore, the Client or government institutes a set of regulations and constraints on which both the planning and financial strategies should be based in the later stage. These regulations and requirements could be about the budgets or capital cost available for this particular project, the priorities of parts of the project, the existing situation, the client's or government's polices....etc. Eventually, both the planning and financial strategies should be configured in a comprehensive phasing strategy with financial description. The number of phases with their components should be defined. Each of which contains also the budget required to be implemented as a future value.

It is a very essential issue How the design concept could be affected by the phasing strategy. In fact, several design decisions could be eliminated or extracted according to the phasing strategy. For example, the architectural zoning should comply with the phasing strategy by collecting the activities included in the same phase in the same group or zone. On the other hand, practically, it is very difficult to collect the activities, which are included in different phases in the same zone or mass because of the sophistications of the implementation procedures. The balance between the functionality, context's situation, and phasing strategy is the challenge in formulating an applicable architectural zoning.

The Financial Strategy pertains not only to determine the capital cost and budgets required for implementing the project under consideration, but also to draw the consistent planning about the distribution of the financial abilities to the different parts of the project. For example, in case of King Khalid University, there are several alternative financial plans. The first alternative is to denominate

yearly all the budgets to implement different parts of all the colleges, while the second alternative is to denominate all the budgets to implement college by college. The third alternative could be defined as a combination of the other two financial planning strategies. The client's or government's priorities and polices play the ultimate role in the way by which the financial strategy could be configured.
The Implementation Strategy is also strongly influenced by the phasing strategy. The determination of priorities and availability of implementation procedures is based mainly on the phases decided before. It is important to select the positions of the masses according to the priority of implementation phases in order to avoid any future obstructions and barriers within the site.

5. KING KHALID UNIVERSITY: An Applied Example

A new university has been needed to be designed and implemented as a part of the development planning strategy for K.S.A at 2004. The new university has to be built in Abuha city and consists of two campuses, one for male and another for female. The capacity of this university should be 50,000 students as a target goal. The researcher was orespo sible or prepar the of space programming and the task of configuration of both the planning and financial strategies. All the colleges and facilities are handled to be included in a coherent strategy, complying with the continuous development plan, which had been drawr before by the government. Because of the limitation of the area available here, it is helpful to illustrate some parts from this extensive study, focusing on the most important issues within this scope [9].
The first example is about the college of education [9]. Table (1) illustrates the total gross area of the project (23,725 m2) and the total relative cost units (27,061 units). General unit cost is calculated for this type of projects and determined as 1.1406 cost unit. From the cost analysis studies for each activity, the present cost value is extracted, i.e. 2269 S.R. Hence, Average cost per meter square as a present value is calculated by multiplying the GCU time PV (CU). Then, the average cost /m2, which equals to 2,588 S.R., could be used as a general value in several similar project types if the space program information is not available. Obviously, the value of the average cost/m2 as a general value could be used in several similar projects is just a present value; it is calculated according to the prices of year 2004. Hence, this value is being changing according to three factors: (1) the values of interest rate and inflation, (2) the country or place where the project will be established, and (3) the year when the project will be established. The total capital cost is also calculated as a present value, (61,411,112 S.R.). In fact, this value of capital cost is conceptually theoretical because it is based on such assumption about all the project components should be implemented at once. Practically, the value of the capital cost will increasing according to the number of implementation years required for establishing the project whether in one phase or more. Even though this value is likely theoretical, it could be as essential as a first step to continue the cost analysis and calculations.
Table 2 illustrates the phasing strategy. The project will be implemented through two sequential phases according to the limitation of budgets available. The first part of the project is proposed as 17,051 m2 while the second part is proposed as 7,603 m2. Each implementation phase engrosses five years. Table 3 illustrates, in details, the financial planning for each phase. The first step is the calculation of the average cost/m2 as future values for each year. The second step is the calculation of the annual budget required yearly to implement a part of the project. These calculations could be easy accomplished because the present value of the capital cost, the interest rate, and the period of the implementation phase are known. The third step is to determine how much of the project could be yearly implemented subject to the constant budget and specific average cost/m2. This table provides the decision maker with the valuable information about the budget required yearly to accomplish the project and the project areas available to be yearly implemented within the phasing strategy.
The second example is about the college of Literature. In this case, the problem is different from the above one. The client needs to implement equal areas yearly through the two phases; each phase contains 5 years. Table 4 illustrates the equal areas required to be yearly implemented, the average cost / m2 as future values for each year, and the budget required yearly to accomplish the certain planning task. All the values of the budgets, which are required yearly, are calculated as future values also, while the present value of the capital cost is determined in previous stages as mentioned before.
Finally, Table 5 illustrates the main summary of the results, financial and planning strategies, and the phasing strategies for the colleges of male campus within King Khalid University.

6. CONCLUSION

This paper presents the outlines of a proposed methodology whose aim is to conciliate the financial strategies and the planning strategies in the case of large construction projects. The proposed model of the cost unit analysis is introduced by this study to determine the average cost / m2 for the project on which all the cost estimation processes will be based in later stages. In addition, this study presents another proposed model aimed at describing all the applicable patterns of interrelationships between the financial and planning strategies. All the mathematical formulas, which are used here, are developed based on the general financial formulas by the researcher, to be suitable for the scope under consideration. All the financial and planning strategies of King Khalid University are presented here as a realistic case study, configured by the researcher, according to the proposed methodology.

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[9] Final Space Program Report for PR.Mohammed Bin Fahd Univ., Zuhair Fayez Company, Saudi Arabia, 2004

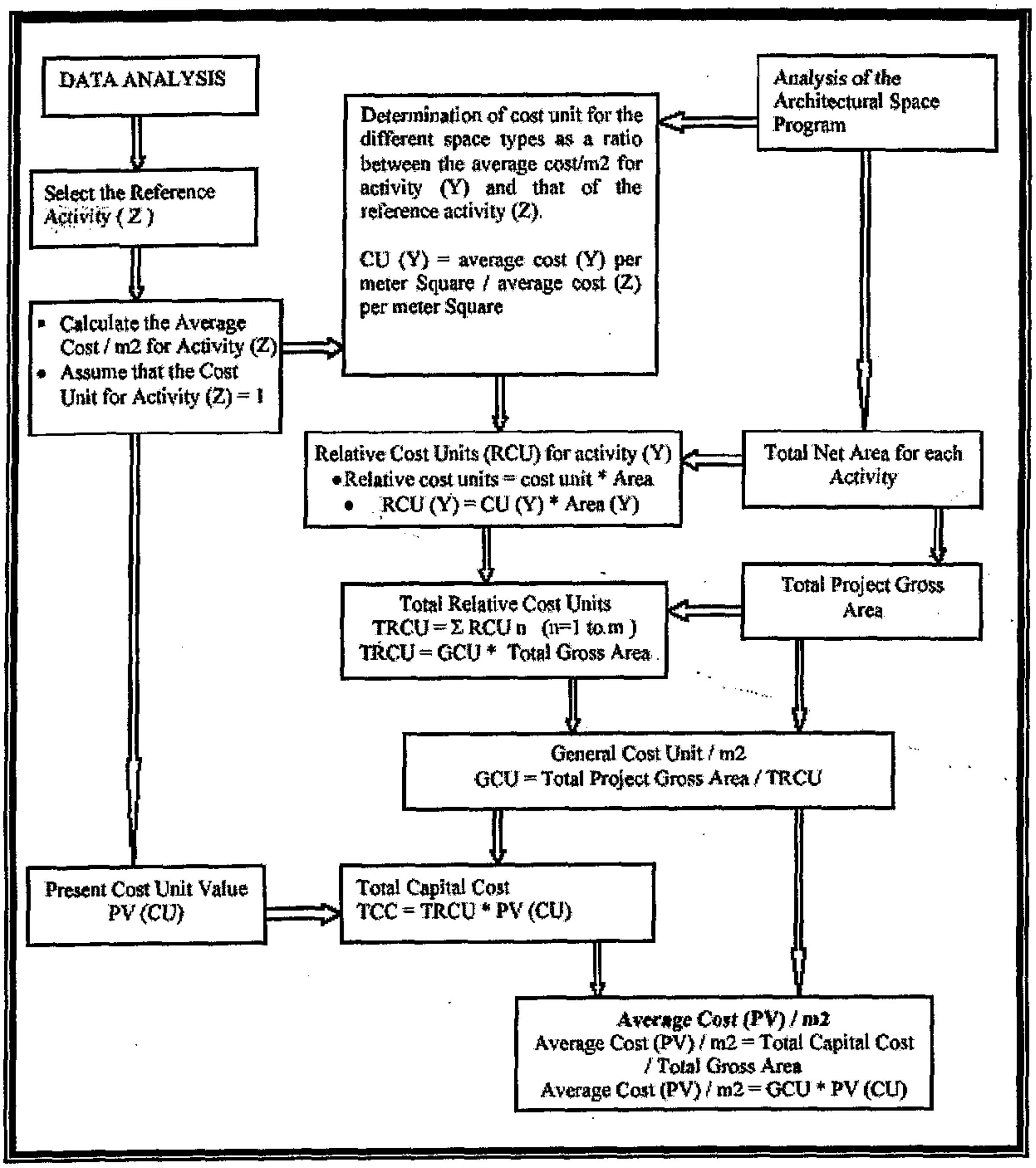

Fig 1. The Proposed Analytical Model for the Cost Unit Analysis in case of the large Architectural and Urban Projects.

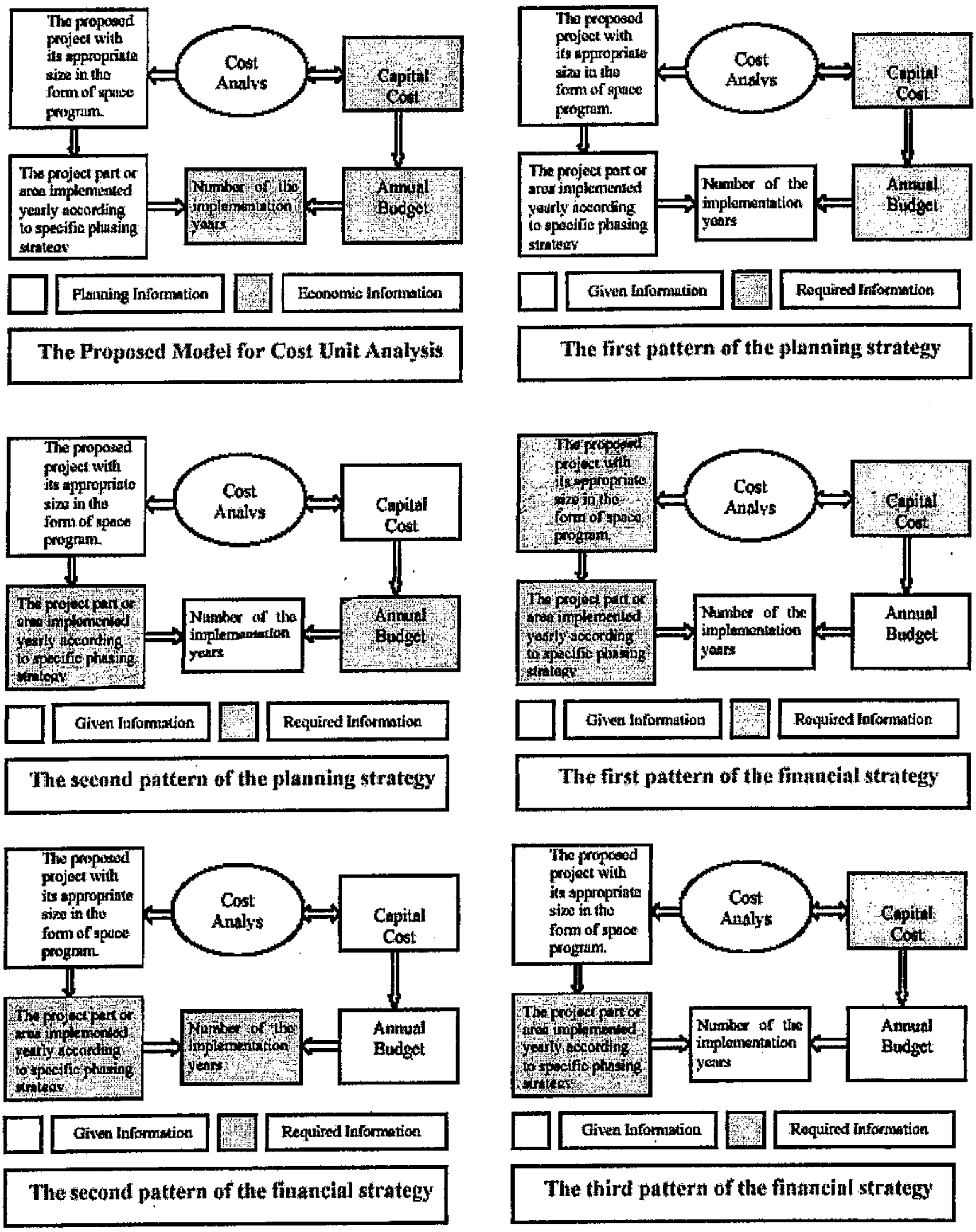

Fig 2. The Proposed Model for the Relative Relationships between both the Planning and Financial Strategies in case of the large Architectural and Urban Projects.

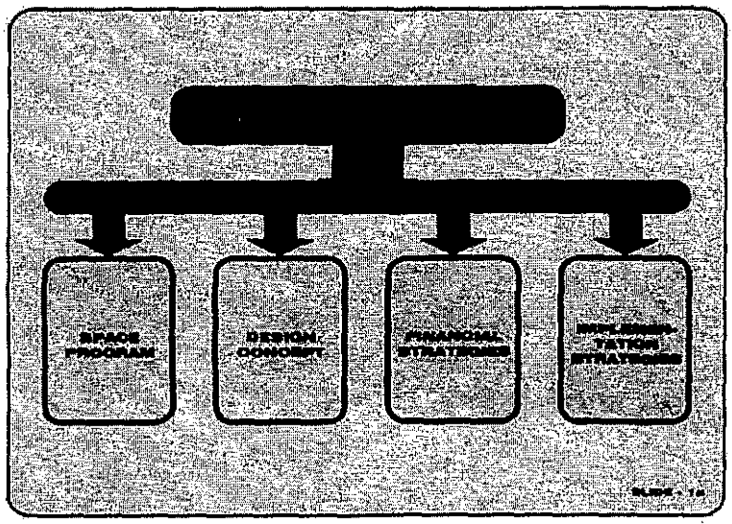

Fig.3. Phasing Strategies influence Space program task, Design Concepts and Decisions, Financial Strategies, and Implementation Stages.

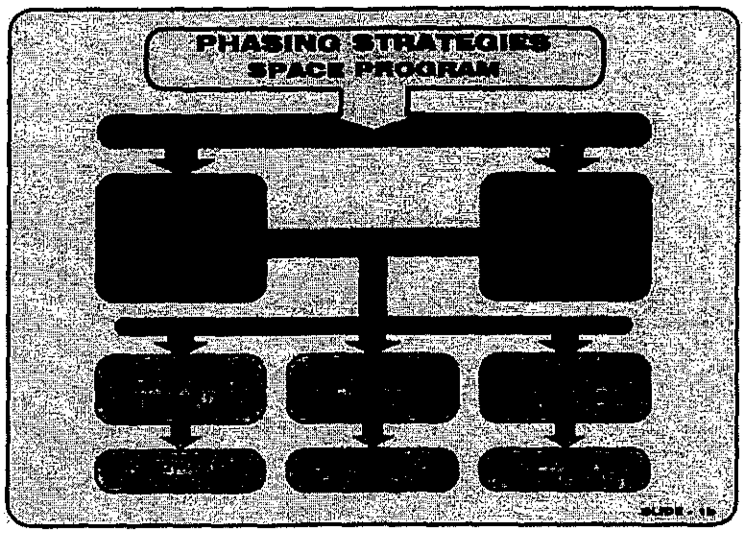

Fig. 4. The Space Program task is configured in the latest version according to the phasing strategy. In fact, two main issues affect the phasing strategies: (1) Cost Analysis and (2) Client's Requirements.

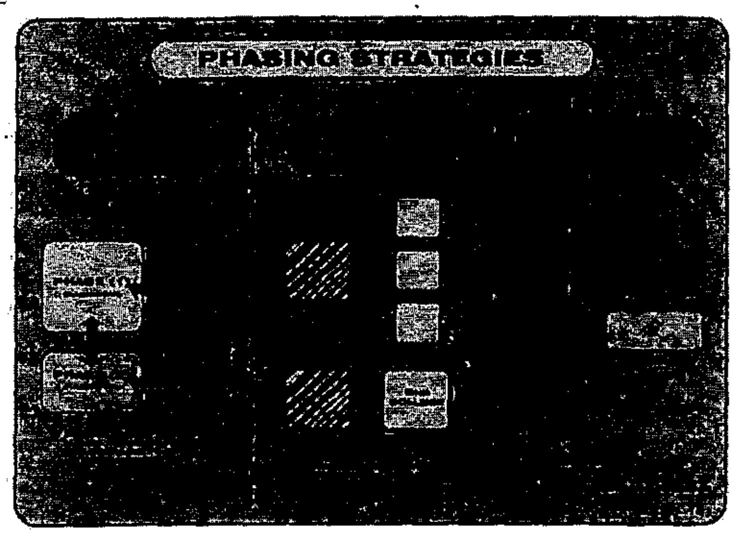

Fig. 5 Phasing Strategy effects on the design concept to reorganize the main zoning of masses. In addition, it plays a role in the way by which the financial strategy could be formulated.
Implementation stages should be configured according to the phasing strategy.

Table 1 The main information for the College of Education according to the space program and phasing strategy with the cost analysis.

TOTAL GROSS AREA - m2	23,725	m2
TOTAL RELATIVE COST UNITS	27,061	CU
GENERAL UNIT COST / m2	1.1406	CU
PRESENT COST VALUE (PCV) - S. R	2269	S.R./UC
TOTAL CAPITAL COST (PV)	61,411,112	S.R.
AVARAGE COST (PV) / m2	2,588	S.R.

Table 2 The Outlines of the Phasing Strategy and Data Analysis; College of Education.

	COLLEGE PROJECT			PHASE "1"			PHASE "2"		
	AREA	COST UNITS	RELATIVE COST	AREA	COST UNITS	RELATIVE COST	AREA	COST UNITS	RELATIVE COST
FUNCTIONAL AREA	15,483	1.252	19389	10,189	1.252	12760	5328	1.252	6673
CIRCULATION AREA	5,419	0.952	5159	3,566	0.952	3395	1,865	0.952	1775
ELECTRO-MECHANICAL AREA	1,548	0.470	728	1,019	0.470	479	533	0.470	250
STRUCTURAL AREA	929	0.765	711	611	0.765	468	320	0.765	245
TOTAL	23,379		25,987	15,386		17,102	8,046		8,943
AVARAGE COST / M2	2,522			2,522			3,069		
PARKING AREA (IN THE FIREST LEVEL)	7,793	0.53	4130	5,129	0.530	2,718	2,682	0.530	1421
AVERAGE COST / m2 for parking	1,203			1,203			1,463		
CAPITAL COST	68,345,113			44,978,860			28,616,932		

Table 3 The detailed Financial and Planning Strategy; College of Education.

PHASE - 1 -							
ANNUAL BUDGET	8,717,856	8,717,856	8,717,856	8,717,856	8,717,856	38,810,347	PV
AVARAGE COST / M2 (FV)	2623	2728	2837	2951	3069		
AREA available to be implemented	3,323	3,195	3,072	2,954	2,841	15,386	
Periodic Payment (PARKING) Annual budget	1,385,620	1,385,620	1,385,620	1,385,620	1,385,620	6,168,533	PV
Avarage Cost (PARKING)	1,251	1,301	1,353	1,407	1,463		
AREA available to be implemented	1,108	1,065	1,024	985	947	5,129	
TOTAL AREA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20,515	
TOTAL ANNUAL BUDGET	10,103,476	10,103,476	10,103,476	10,103,476	10,103,476	44,978,880	Pv
PHASE - 2 -							
ANNUAL BUDGET	5,546,565	5,546,565	5,546,565	5,546,565	5,546,565	24,692,323	PV after 5 years
AVARAGE COST / M2 (FV)	3,192	3,319	3,452	3,590	3,734		
AREA available to be Implemented	1,738	1,671	1,607	1,545	1,486	8,046	
Periodic Payment (PARKING) Annual budget	881,573	881,573	881,573	881,573	881,573	3,924,608	PV after 5 years
Avarage Cost (PARKING)	1,522	1,583	1,646	1,712	1,780		
AREA available to be Implemented	579	557	536	515	495	2,682	
TOTAL AREA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
TOTAL ANNUAL BUDGET	6,428,139	6,428,139	6,428,139	6,428,139	6,428,139	28,616,932	PV after 5 years
						23,521,032	PV NOW

Table 4 The financial and planning strategies for College of Literature.

PHASE -1-							
AREA available to be implemented	3353	3353	3353	3353	3353	16765	Total
AVARAGE COST / M2 (PV)	2533	2635	2740	2850	2964		
ANNUAL BUDJET	8,494,013	8,833,774	9,187,125	9,554,610	9,936,794	40,836,602	PV
AREA available to be implemented	1118	1118	1118	1118	1118	5588	Total
Avarege Cost / M2 (PARKING)	1,251	1,301	1,353	1,407	1,463		
Periodic Payment (PARKING) Annual budjet	1,398,053	1,453,975	1,512,134	1,572,620	1,635,524	6,721,409	PV
TOTAL ANNUAL BUDJET	9,892,066	10,287,749	10,699,259	11,127,229	11,572,318	47,558,011	
PHASE -2-							
AREA available to be implemented	2,306	2,306	2,306	2,306	2,306		
AVARAGE COST / M2 (PV)	3,082	3,205	3,334	3,467	3,606		
ANNUAL BUDJET	7,106,900	7,391,176	7,686,824	7,994,296	8,314,068	34,167,791	PV
AREA available to be implemented	769	769	769	769	769		
Avarege Cost / M2 (PARKING)	1,522	1,583	1,646	1,712	1,780		
Periodic Payment (PARKING) Annual budjet	1,169,744	1,216,534	1,265,195	1,315,803	1,368,435	5,623,771	PV
TOTAL ANNUAL BUDJET	8,276,645	8,607,711	8,952,019	9,310,100	9,682,504	39,791,561	

Table 5 Summary of results for the male colleges; King Khalid University.

ITEM	SHARIA			LITERATURE			EDUCATION			LANGUAGES			Administration Sciences		
Main Components (Area m2)	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Classrooms	2,918	2,684	5,602	2,993	3,181	6,174	1,301	888	2,189	3,338	0	3,338	2,193	1,891	4,084
Teaching Lab.	0	0	0	279	283	562	2,898	1,845	4,743	0	0	0	0	0	0
Open Lab	1,430	374	1,804	851	743	1,594	925	511	1,436	2,029	0	2,029	1,115	735	1,850
Resaerch Lab.	100	1,405	1,505	100	1,411	1,511	100	466	566	1,458	0	1,458	100	1,405	1,505
Offices	3,477	930	4,407	3,174	630	3,804	2,899	312	3,211	3,653	0	3,653	3,170	673	3,843
Library and study facilities	2,550	0	2,550	1,657	0	1,657	1,786	80	1,866	1,697	0	1,697	1,562	0	1,562
Support Facilities	1,798	730	2,528	2,049	694	2,743	1,384	313	1,697	3,077	0	3,077	2,050	625	2,675
Total Net Area (m2)	12,273	6,123	18,396	11,103	6,942	18,045	11,293	4,415	15,708	15,252	0	15,252	10,190	5,329	15,519
Gross Area (m2)	18,532	9,246	27,778	16,766	10,482	27,248	17,052	6,667	23,719	23,031	0	23,031	15,387	8,047	23,434
Parking Area (m2)	6,177	3,082	9,259	5,589	3,494	9,083	5,684	2,222	7,906	7,677	0	7,677	5,129	2,682	7,811
TOTAL AREA (m2)	24,710	12,328	37,037	22,354	13,977	36,331	22,737	8,889	31,625	30,707	0	30,707	20,516	10,729	31,245
% Area to be implemented	66.72%	33.28%	100.00%	61.53%	38.47%	100.00%	71.89%	28.11%	100.00%	100.00%	0.00%	100.00%	65.66%	34.34%	100.00%
Capital Cost (S.R.)	51,825,206	31,455,069	77,679,675	47,596,321	30,115,459	77,323,714	[illegible]	21,569,561	[illegible]	54,176,414	0	54,176,414	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]			[illegible]			2,303			[illegible]			[illegible]		
[illegible]	[illegible]			[illegible]			[illegible]			[illegible]			2,572		