



## A Design of Enterprise Systems View on the Saudi Arabian Housing Sector

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*Abstract : Enterprise engineering is a sub discipline of industrial systems engineering and a life-cycle oriented discipline for the identification, design and implementation of enterprises and their continuous evolution supported by enterprise modeling. Enterprise engineering helps to examine each aspect of the complex socio-technical system that comprises interdependent resources of people and organizational flow, business processes and information flow, material flows and associated technology that must interact with each other and their environment in support of a common mission. The focus on the design of the enterprise as a whole, or on the design and integration of certain business components, help to create an abstraction of a current existing system, then compare it to an improved perspective of the systems abstraction, in support for optimizing the current abstracted system placed into the perspective of a desired state to be. Creating a comparison between the abstraction of the Saudi Arabian housing sectors business components and the abstraction of a desired state to be for the given business components with the aid of enterprise engineering. A legislative change as part of the business process and information flow examination is found to create a potential increase in the number of benefiteres, who are in need to own a house by 25 percent, from 30 percent up to 55 percent with respect to the implementation of a legislative amendment carried out by the ministry of housing.*

*Keywords: Design of Enterprise Systems, Saudi Arabian Housing Sector, Ministry of Housing, SAMA, DBR, APR.*

### 1. INTRODUCTION

Enterprise engineering is a discipline in which the artifact of study is not physical. One cannot hold an enterprise in one's hand. One cannot look at an enterprise as one would look at a house. While one cannot directly see an enterprise system, one can perceive parts of the enterprise system, its inputs, outputs, and behavior. In order to understand enterprise systems and to analyze the properties of enterprise systems, one must model them. For this reason, the enterprise engineer needs to have a full appreciation of the central role modeling plays in enterprise design. A model is an abstract representation of a real-world system that emphasizes some aspects of the system that captures the essential system characteristics of importance while excluding other aspects as explained by Checkland (1982), Jackson (2000).

What is included or excluded depends on the purpose of the model. The reason for establishing a model is to reduce the complexity of understanding or interacting with a system by eliminating the detail that does not influence its relevant behavior improvement (Giachetti, 2010). The review of the Saudi Arabian housing sector from the perspective of the enterprise engineering discipline enables the creation of an abstraction of the current situation and a contrary abstraction for a desired situation to be at, identifying elements for potential improvement. The reason behind reviewing the

Saudi housing sector is to search for alternative solutions towards the increasing complexity of the housing shortage problem, affecting two million citizens in need for a house, four folds more than the intended number of citizens targeted by the ministry of housing. Currently in the market, only 20 percent of the targeted citizens earn an adequate monthly salary that would enable them to purchase a piece of land with the aid of a credit facility from a bank (Dorchester, 2014).

Oil price volatility has a major impact on the Saudi Arabian economic growth.

Where for the year 2016 for example, the annual citizen income was 20,484 U.S. Dollars (Al-Sasi et al 2017), an amount that would enable a potential customer to obtain a credit facility from a bank in form of a mortgage at a maximum amount of 102,420 U.S. Dollars way below the minimum market price for a home alone detached house.

### 2. SYSTEM COMPONENTS OF SAUDI ARABIA HOUSING SECTOR

The main components of the Saudi housing sector consist of the Ministry of Housing, developers, banks and the end user customers as shown in Figure 1.

System components of the Saudi Arabian housing sector



Fig.1 System components of the Saudi Arabian housing sector

The role of the ministry of housing is that of the legislator, synchronizing the various interacted activities between the remaining components, which are essentially required to materialize the housing products for the end users. Among the diverse legislative duties of the ministry of housing is the setup of consultative consensus regarding the maximum allowable debt burden ratio (DBR) for borrowers, end customers, taking up housing loans from banks, creditors, which would enable them to purchase the constructed house from the developers as end customers. The procedure required for reaching consensus on the maximum DBR involves, creditors presented by the various domestic banks, the legislative central bank represented by the Saudi Arabian Monetary Agency (SAMA) and the ministry of housing. The current agreed on DBR for borrowers purchasing houses is set at a maximum monthly installment rate equivalent to 50 percent deductible from the bank account deposited monthly salary.

Purchasing price of one single unit (a detached house)

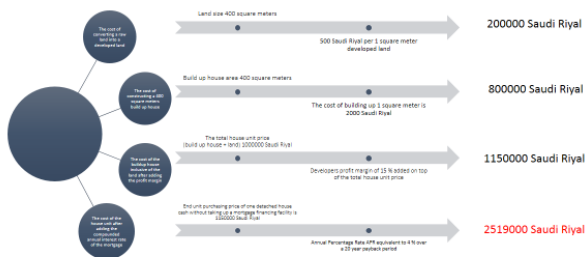


Fig.2 Purchasing price of one single unit (a detached house)

For a family made up of four members, the foreseeable size of a piece of land could be set at a size of 400 square meters. The cost estimate for a developer to convert raw land into a developed land equipped with all essential facilities such as electricity grid network, fresh water network, sewage network and telecommunication fiber optic network is set at a price of 500 Saudi Riyal or 134 U.S. Dollar per square meters. Adding up to 200,000 Saudi Riyal or 53,000 U.S. Dollars for a 400 square meters large piece of developed land. Furthermore, the construction cost for a 400-square meter house can be estimated at a cost of 2000 Saudi Riyal or

530 U.S. Dollars per square meters. The construction cost accumulates to 800,000 Saudi Riyal or 213,000 U.S. Dollars. Adding on to the cost for the 400-square meter developed piece of land the house unit price aggregates to 1150,000 Saudi Riyal or 307,000 U.S. Dollars inclusive of a 15 percent profit margin added in favor for the developer towards the house construction service. The estimated amount for the stand alone detached house is the price tag for cash buyers, the cost is aggregated to 251,19,000 Saudi Riyal or 672, 000 U.S. Dollars for mortgage buyers over a 20-year payback period compounded annually and an Annual Percentage Rate (APR) equivalent to 4 percent (White et al, 2012) as shown in Figure 2.

3. ABSTRACTION OF THE CURRENT SAUDI ARABIAN HOUSING SECTOR

The potential end users in need for a house or customers to benefit from the developer's construction service is limited to the buyer's segment who earn a minimum monthly salary equivalent to 21,890 Saudi Riyal or 5837 U.S. Dollars, representing the upper salary bracket that makes up 32 percent of the registered private sector workforce, as shown in Figure 3

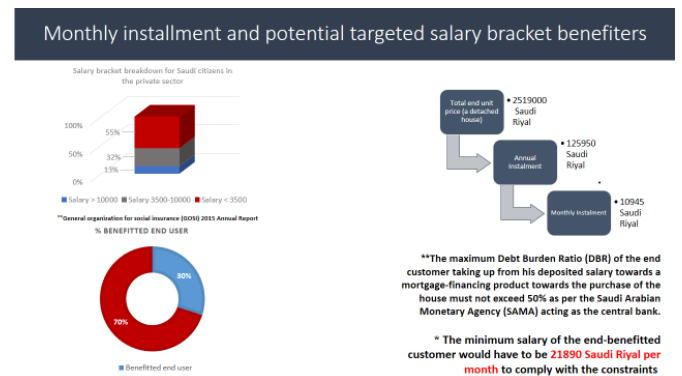


Fig.3 Monthly installment and potential targeted salary bracket benefiter's current abstraction

4. ABSTRACTION OF THE DESIRED SAUDI ARABIAN HOUSING SECTOR

The desired abstraction of the Saudi housing sector could increase the number of benefiter's in need for a house by 25 percent, from 30 percent up to 55 percent with respect to the implementation of a legislative amendment carried out by the ministry of housing. The proposed legislative change includes an introduction of a 500,000 Saudi Riyal or 133,000 U.S. Dollars interest free credit facility authorized by SAMA with the consent from the ministry of housing offered to the end users or customers through the crediting banks. Once such legislative action is revised and approved for implementation, the minimum monthly required salary for a potential customer to benefit out of the proposed change, which would enable the end user to own a house will decrease from 21,890 Saudi Riyal or 5837 U.S. Dollars down to 16,034 Saudi Riyal or 4275 U.S. Dollars as shown in figure 4.

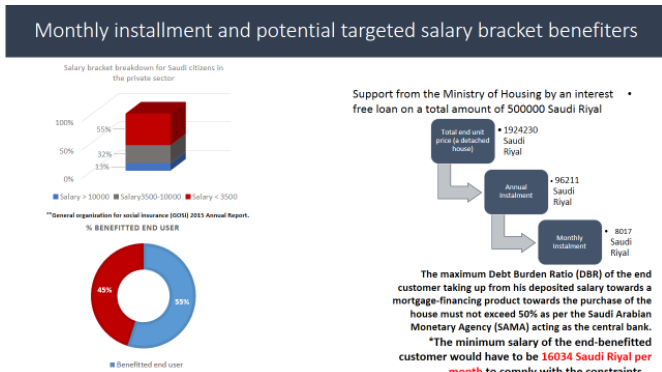


Fig.4 Monthly installment and potential targeted salary bracket benefiter's to be desired abstraction

### 5. CONCLUSION

The usefulness of models is the fact that they simplify reality, representing the system in a form that one can comprehend. A model that has all the details of the system being modeled would be just as complex as that system and just as unreadable. The process of modeling helps one clarify the thoughts about the system. For this reason, many modelers find the actual learning through exposure during the modeling process as valuable as the model itself. The abstraction creation process in comparison to the desired abstraction, to be state, enabled the identification of a potential legislative change. The proposed legislative change once implemented by the ministry of housing, could create

great potential to increase the number of benefiter's seeking to own a house by 25 percent, from 30 percent up to 55 percent.

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