

UNDERSTANDING THE DRIVERS AND NEEDS FOR MEGA INFRASTRUCTURE PROJECT DEVELOPMENT IN SAUDI ARABIA

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Mega infrastructure projects (MIP) are continuously complicated along their lifespan. Whether in their planning or execution stages, they are highly diverse from one another and require different approaches for their planning and decision-making. The Saudi infrastructure sector is booming and many projects can be classified as Megaprojects. That is, they come with a minimum life span of fifty years and a starting price that exceeds GBP 1 Billion. The current investment for infrastructure in the Kingdom of Saudi Arabia is about GBP 100 Billion per annum. In order to provide contextual knowledge for scholars decision makers, this paper explains the goals, agendas and forces driving MIP development in the specific context of the Kingdom of Saudi Arabia. In order to understand more and rank these drivers, Multi Criteria Analysis will be used in combination with data gathered from two sources: firstly, knowledge (gathered from questionnaire data) from a pool of the Saudi Council of Ministers and the Bureau of Experts – the ‘Shura Council’ or the Consultative Assembly of Saudi Arabia. Secondly a historical analysis of Saudi’s five-year plan goals and objectives from 1970-2019 is used in order to understand and track the development priorities of the nation. Results suggest that as well as societal and economic drivers, the religious values are significantly important, expressed by the need to safeguard and uphold Islamic values.

Keywords: Decision Analysis, economic development, Mega Infrastructure Projects, Saudi Arabia.

INTRODUCTION

Mega infrastructure projects (MIPs) are significant developments that exceed the relative norm of infrastructure projects. Dimitriou (2009), in a consideration of privately financed mega transport projects, explains that within a description of an infrastructure project, the word “mega” refers to a significant increase in its size, budget, lifespan, complexity and uncertainty. MIPs are known for their high complexity, risks and uncertainty. They exceed a fifty-year lifespan and a billion pound budget (Bruzelius *et al.*, 2002). Graham and Marvin (2001) argue that progress and development cannot unfold without the presence of MIPs. Flyvbjerg *et al.*, (2003) refers to MIPs as political animals that feed on a country’s resource. Their financial and social stakes are so large that they can endanger the survival of corporations or threaten the economic stability of the countries involved (Eweje *et al.*, 2012).

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MIPs make great impacts and clearly need to be planned and designed on a rational basis. They are constantly developed for political, economic, social or environmental reasons. Despite their growing popularity, MIPs often fail to meet cost estimations, project objectives and time schedules (Marrewijk *et al.*, 2008). Cost escalations within MIPs happen in almost nine out of ten projects with an average cost increase of 28 percent on average (Giezen, 2012). Flyvbjerg (2003) found that cost overruns of 50-100% in fixed prices are common for MIPs. Budget overruns and lower effectiveness has led researchers (e.g. Altshuler and Luberoff, 2004) to question the rationale and the sustainability of MIPs.

Allport (2011) and Williams and Samset (2010) have argued that a significant part of an MIP's success is achieving effectiveness through the delivery of its strategic intention which was based on policies that give birth to such projects. MIP success, therefore, is not merely based upon time, budget and quality, which are usually referred to as "the iron triangle", but rather success is based upon the achieved public policy.

Contextual information is a key factor in successful decision-making. Being aware of the context in which a project is developed is a constructive way to address the risks, uncertainties and complexities that characterize MIPs (Dimitriou *et al.*, 2012). Zhi (1995) notes that each project has its own unique risk and organisational context that influence the strategic approach on the intended MIP. Contextual influences can even affect the rationale behind the project and what constitutes as success (Dimitriou *et al.*, 2013).

This paper aims to better understand the goals and visions driving MIP development in the context of Saudi Arabia. For an MIP strategy to be effective, it must have a vision and address both 'manifestation' and 'root problems' and the need of strategies to reflect these dynamics and influenced by them as driving forces. (Dimitriou *et al.*, 2013). Key project stakeholders need to identify and analyse the context surrounding MIP decision-making (Dimitriou *et al.*, 2012). In a study of the power of context on Asia's MIP scene, Dimitriou (2006) explains that effective problem solving has appreciation for the context surrounding the problems.

Knowing and understanding the context's agenda and leading goals will therefore help develop further research the Saudi context, a pre-step necessary before any decision process is formed. The paper aims to dwell into the Saudi context in regard to MIPs. It will consider the Saudi Five-Year plans which include the goals, projects and programmes that needs to be developed. If it is considered, as Eweje *et al.*, (2012) adds, that MIPs are programmes that integrate strategically-aligned projects into one very large project then from this perspective, we can view the Five-Year Plan as an MIP. We can argue on the current success of Saudi Five-Year Plan in relation to its policy effectiveness. Analysis of the Five-Year Plan offers the vision and priority goals of the Saudi context and who can that have an effect on future research of MIP planning and decision making within the Saudi context.

CONTEXTUAL SETTING: SAUDI ARABIA

This research outlined in this paper ventures into the context of Saudi Arabia, one of the wealthiest nations in the world. With 264 billion barrels the Kingdom has the world's second largest oil reserve after Venezuela, a proportion of approximately 16%. It also has the largest production capacity in the world and pumps just under 12 million barrels per day (EIA, 2014). The country is highly dependent on this unique

natural resource as the oil industry produces 75% of state revenues. Rahman and Khondaker (2012) note that oil export revenues account for around 90% of total Saudi export earnings and 75% of the state's overall revenue.

Saudi Arabia hasn't always been a wealthy nation. According to the Ministry of Planning (2015), the nation was economically poor before 1948, when 90 percent of the population were either nomads or farmers. Between 1948 and 1952, the country saw a change in what it considers the early innovation period and a turning point for the country. The country prepared its first formal budget in 1948. Revenues started to build, basic infrastructures developed, and modern port facilities were completed in Jeddah. In 1951, Saudi Arabia conducted its first major MIP, the Dammam-Riyadh railway, a 52 million USD project, even though it was considered a costly investment (at the time, oil revenue was about 50 million dollars per year).

Early development occurred during the period between 1952 and 1970, which helped the Saudi GDP grow at an annual rate of 10.6%. By 1970, rapidly developing infrastructures caused an emergence of substantial metropolitan centres in Riyadh, Jeddah, Dammam, Mecca, Medina, and Hofuf (Ministry of Planning, 2015).

Until 1970, institutional expansion, mainly focussing on health, education, and physical infrastructure, followed the growth of the oil revenues (Ministry of Planning, 2015). After 1970, King Faisal initiated a series of Five-Year Plans. Sichertman (2011) notes that these plans were primarily focused and intended for Saudi Arabia's economy; the objective was to provide the government with the tools to become a modern technological society while maintaining the religious morals that underpinned its legitimacy. By 2015, however, as Fattouh and Sen (2015) explain, the Kingdom faces key issues, in particular dependency on depleting oil reserves in a destabilised geographic location.

METHODS

The paper uses two sets of data to understand the goals and visions driving Saudi's MIP development. The first set includes 28 questionnaires completed by members of the Regulative and Executive Authority (of the 183 total members, 33 sit on the Council of Ministers and 150 on the Shura Council). The questionnaires were requested respondents to score the ninth Five-Year Plan goals from 1 to 10. 23 of the respondents were from pre-selected Shura Members, and the remaining 5 from pre-selected Council of Ministers. The pre-selecting method offered a way to approach the difficulty of access to participants who serve on the councils. The second set of data are the Five-Year Plans "goals" in their various iterations since their beginning in 1970 until the ninth plan in 2014.

Table 1 shows the vehicle in which data are considered. The analysis will adopt a Multi-Criteria Analysis framework, an example of which is shown in Table 2. It is to be noted that MCA is based on uncovering the potential of success or not. It is a decision-making tool to aid decision makers. This is not the primary concern of the research; rather it is focused on uncovering development priorities. Thus the "Impact of Assessment" score in Table 2 is replaced by "Historical Occurrence" as illustrated in Table 1. Historical occurrence is the frequency of repetition of a goal along the Five-Year Plans studied.

The framework will conclude with a ranking of the Saudi leading goals that are taken from the Ninth Development Plan (2009-2014). Those that are ranked highest will be measured for success through collected data and further literature. The results will

facilitate a discussion on the contextual aspects of the Kingdom and provide contextual depth for the Kingdom of Saudi Arabia.

ANALYSIS AND RESULTS

As shown in Table 1, the framework consists of five columns: the ninth Five-Year Plan goals; the average weighting of each goal as measured by the questionnaire; the historical occurrence of each goal; the score of each goal, produced by multiplying the average weight with the historical occurrence; and finally, each goals ranking.

Table 1: An example of the study framework

Five-Year Plan goals	Weight (1-10)	Historical occurrence (0-8)	Score	Ranking
Goal I	10	5	50	B
Goal II	10	2	20	D
Goal III	9	4	36	B

Table 2: A typical MCA framework

Goals	Weight (1-10)	Impact of Assessment	Score	Ranking
Goal I	10	5	50	B
Goal II	10	2	20	D
Goal III	9	4	36	B

The aim of the ranking is to uncover priorities of the context. While all goals and objectives are interesting, this paper will focus on only high priority goals, ranked A, B or C. The historical occurrence will help correct any errors with the questionnaire. It will solidify the results of the questionnaires by including their impact on the final scoring. Because the Five-Year Plans were initiated in 1970, they provide an opportunity to track government goals for a period of more than forty years, which allows the researcher to trace each goal back to the first Five-Year Plan. The more they dwell further back, the more they gain priority and offer the opportunity to uncover root issues. Nevertheless, contexts exist in a cycle that changes depending on multiple inputs and outputs. Thus, a historical tracking of the goals is only a start.

The ranking system is shown in Table 3.

Table 3: Ranking system

Score	Ranking
55 and above	A
35-54	B
25-34	C
15-24	D
14 and below	E

Questionnaires were administered between January and March 2016 to address current concerns. Combining current weighting of goals with historical occurrence will produce a more accurate representation of contextual priorities than either of these factors taken individually. These two entities complement each other and offer a more accurate representation of reality than analysing either independently.

This paper does not select the Tenth Plan (2015-2019) as a focus of the research for two reasons. Firstly, the Tenth Plan has been put on hold. The Ministry of Planning did not release the final document and is subject to change. Secondly, if chosen for this study, the Tenth Five-Year Plan would make it impossible to measure priority goals and achievements until post 2019, which would set back this research because the study aims not only to uncover the goals and drivers of MIP development in Saudi Arabia, but also to better understand the Five-Year Plan current condition because the

Five-Year Plan is a powerful vehicle that carries the initiation of multiple MIPs. Table 4 shows the results of the questionnaire analysis.

Table 4: Results of the MCA Analysis on Questionnaire Returns

	Goals	Weight (1-10)	Historical occurrence (0-8)	Score	Ranking
1	To safeguard Islamic teachings and values, enhance national unity and security, guarantee human rights, maintain social stability and consolidate the Arab and Islamic identity of the Kingdom.	9.4	8	75.0	A
2	To continue to develop the holy places, and improve the services provided to Hajj and Umrah performers to ensure performance of religious rites easily and conveniently.	5.9	1	5.9	E
3	To achieve sustainable economic and social development by accelerating the rate of economic growth and social welfare.	7.1	1	7.1	E
4	To achieve balanced development among regions of the Kingdom	7.3	4	29.2	C
5	To enhance human development, expand the range of options open to individuals to enable them to acquire and use knowledge, skills and expertise, and provide appropriate healthcare services.	6.6	7	46.2	B
6	To raise the standard of living and improve the quality of life of all citizens.	5	4	20	D
7	To diversify the economic base horizontally and vertically, expand the absorptive and productive capacities of the national economy and enhance its competitiveness, and maximize the return on competitive advantages.	7.1	8	56.8	A
8	To move towards a knowledge-based economy and consolidate the basis of an information society.	5.2	1	5.2	E
9	To enhance the role of the private sector in socioeconomic and environmental development and expand domains of private investments (domestic and foreign) and public-private partnerships.	4.8	4	19.2	D
10	To develop, conserve and ensure rational utilization of natural resources, particularly water, protect the environment and develop environmental systems within the context of sustainable development.	4.7	1	4.7	E
11	To continue socioeconomic and institutional reform, develop regulations aimed at raising efficiency and improving performance, work towards entrenching transparency and accountability, and support civil-society institutions in advancing their developmental activities.	6.3	0	0	E
12	To strengthen economic integration with Gulf Cooperation Council and Arab states and develop relations with Islamic and friendly countries.	3.6	5	18	D
13	To develop the sector of Small and Medium Enterprises to increase its contribution to GDP, and create frameworks for nurturing and organizing it.	5	0	0	E

DISCUSSION: HIGH PRIORITY GOALS

Rank A

Safeguarding Islamic values and confirming Sharia play key roles in the political agenda and are highly visible throughout the Five-Year Plans. The Saudi people are generally conservative, and their religious figures heavily influence public opinion.

As Albassam observes (2015), for the last half-century, the Kingdom has been held together informally through a alliance between the government and the traditional religious leaders.

Because the Kingdom of Saudi Arabia is located in a tense region under constant conflict, defence and internal security are also important themes. Saudi Arabia borders two countries at war: Iraq in the north and Yemen in the south. While the commentary is now nearly twenty-five years old, the words of Tempest (1992) are still relevant to the security dilemma in the Middle East:

As the superpowers disarm and dump increasingly sophisticated weapons and the rest of the world's arms manufacturers, stripped of traditional markets at home, now queue to be allowed to pour their product into the Middle East, the trickle is turning into a flood. Sooner or later, one country or another which sees the narrow comparative advantage will want to use the weapons

Thus, a significant percentage of the budget goes to defence capabilities. Figure 1, which shows each sector of the Saudi government's budget from 2002-13, illustrates that the majority of the budget goes to defence and security in answer to its goal of upholding security that comes with a huge cost, which clearly reflects the fragile state of the Middle East.

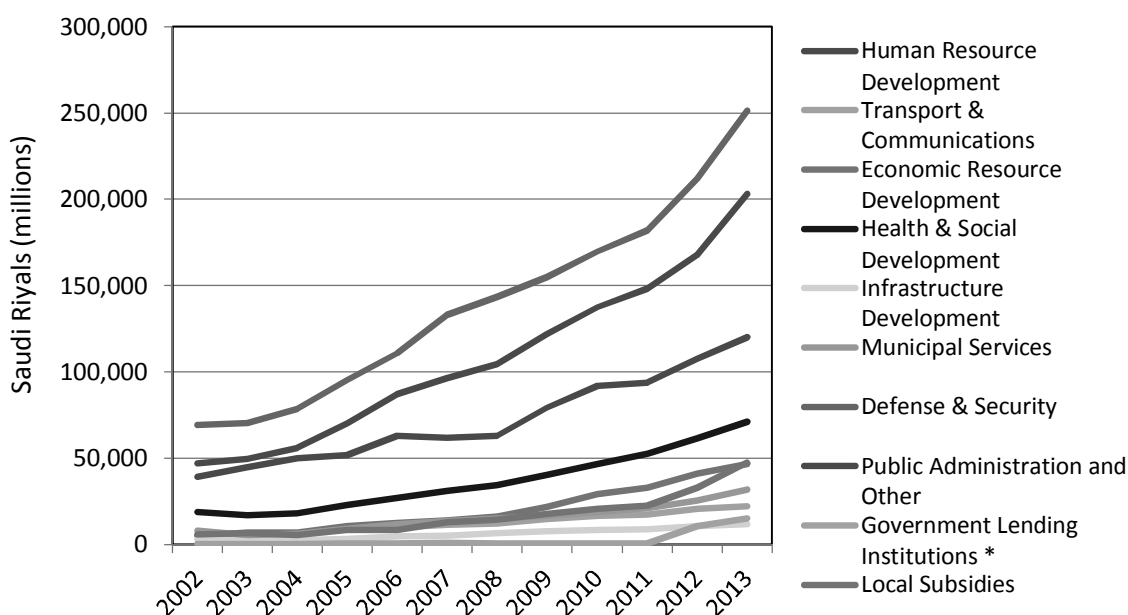


Figure 1: Saudi Arabia governmental budgets (2002-2013) (Source: Saudi Ministry of Finance, 2015)

Although it should have been delivered through the aid of economical MIPs, the kingdom has shown no progress reducing dependence on oil, diversifying the economy or developing a balanced growth.

Using iterations of the Five Years Plans since 1970, Albassam (2015) investigated whether the following objectives have advanced or not: oil as a percentage of GDP, private sector as a percentage of GDP, oil as a percentage of the country's exports, and oil revenues as a percentage of total government revenues—over nine Development Plans (1970–2013). He concludes that oil still dominates almost all the variables studied and this objective is a long way from being achieved.

Albassam (2015) further argues that that objective of diversifying is not functioning for several reasons: (1) the absence of a clear plan that details the process of diversifying, (2) the aided sector for economy diversification is mainly dependent on oil (petrochemical industries), (3) the private sector depends on government spending and projects, and (4) the lack of a clear and specific plan on supporting non-oil sectors (e.g., agriculture, service). He raises the possibility of a link between resource curse theory and Saudi Arabia:

Conversely, many countries that draw a high percentage of their national income from a natural resource fall into what is known as the “resource curse,” where the country relies almost exclusively on that resource and does not make sufficient effort to diversify its income resources, which has a negative influence on its economic development

Albassam further adds that the private sector’s dependence on government spending negatively affects the role that the private sector should play in diversifying the economy. Thus, economic diversification efforts by the Saudi government have shown little success in meeting the development plans’ objectives. As noted by Farzin (1993) in considering the United Arab Emirates, rich oil countries rely heavily on oil, because it has become a comfortable source of income. That takes a toll on any economic diversification objective. Any fluctuation on the petroleum market – and of course this happens regularly - will jeopardize domestic investments by disrupting the revenue stream needed to finance them.

Rank B

It has been noted since the first Development Plan that a major issue is the demand for human resources; thus, there has been a high level of non-Saudi labour that the Saudi government has been trying to reduce. It is perhaps unsurprising therefore that developing human resource was ranked B and is considered very important to the Saudi government and this is expressed by a policy of reducing the difference between Saudi and non-Saudi employees. Unfortunately, while every plan aims to reduce that gap, data show that in 2006 non Saudi employees represented 54% of the whole, while in 2015, this proportion rose to 56% (Central department of statistics and information, 2016). This further showcases the lack of effectiveness the series the series of Five-Year Plans has had on accomplishing stated goals and highlights the need for further development.

Rank C

Balancing development in the Kingdom ranked (C). Albassam (2015) links this objective to diversifying the economy:

Balanced development between urban and rural areas is recognized as one benefit of economic diversification. As many studies have shown, in less diversified economies, development and job creation tend to be concentrated in urban areas or near oil fields or mines and mineral processing plants.

In analyzing the determinants of the Arab Awakening, Costello *et al.*, (2015) invoke once again the ideas of resource or “oil curse” and argue that economic dependence on oil and natural gas production creates unemployment and major social disparities and inequalities, and these aspects might explain the country’s unbalanced growth.

The issues of balanced growth is complex in the Saudi context. The economical engines in Saudi Arabia are split in three provinces with no mega transport infrastructure linking them to surrounding areas. The current engines are in the east, west and center. That growth in the center followed Riyadh the capital. Since the oil

fields are in the Eastern Provenance, this region houses the oil industry. The Western province is a very sensitive and important part of the country; it includes Mecca and Madinah (Medina), the holiest cities to every Muslim. Growth in the north and south is not consistent with the rate of growth in other provenience, and unbalanced growth has become a reality. A combination of developing economical engines covering the country in every provenance and linking them with transport MIPs would help spread growth in the country as whole. Transport MIPs can help provide economic growth to surrounding areas by connecting them to a city that holds an economic engine (Aguilar and Ward, 2003). Transport MIPs create a lucrative investment climate around them or foster improvements upon the investment climate. As observed in South Africa and Mozambique they even benefit the small investors in other sectors of the economy via their deliverable positive investment climate (Castel-Branco, 2004).

Saudi Arabia wasn't free from developing its basic infrastructure until the early 1980s (Ministry of Planning, 2015) and afterwards, the Gulf War coupled with oil market crashes exhausted its resources (Linderoth, 1992). Since then, it has focused on maximizing its revenue from its oil industry. As Fattouh and Sen (2015) assert, the petroleum industry ranks high in the country's agenda, and it is necessary to overcome huge debits due to budgets deficits in the 1980's and 90's. Nevertheless, the Kingdom should give concern for establishing more economical engines along its provinces and constructing Transport MIPs to spread growth to surrounding areas and balance growth.

CONCLUSIONS

Infrastructure development in Saudi Arabia has significant issues – the investment is in the region of GBP100 Billion per annum and the context in which the planning and development is undertaken has unique issues manifested in terms of political, religious, economic and cultural aspects.

In order to investigate these issues further, and as part of a wider research project considering decision making in Saudi infrastructure development, this paper aimed to understand the priority goals within the Saudi context and to uncover root issues that are interlinked or independent. The study, using consultations with key Saudi decision makers has affirmed the four top priority development goals: upholding Islamic values and the security of the Kingdom; diversifying the economy; developing human resources and balancing growth across the Kingdom.

This knowledge is essential for effective planning and delivery of Saudi infrastructure, many implementations being Mega Infrastructure Projects (MIPs). But the analysis has left us with what seems to be a major root issue: the Five-Year Plan. In its multiple iterations, the Five-Year Plan has shown low levels of success, and its selection of programmes and projects does not deliver some of its main goals. These are identified as: diversifying the economy, developing human resource and a balanced growth along the regions of the Kingdom. Almost fifty years since its first draft, the Five-Year Plans continue to yield low effectiveness and achievement of these polices, which the literature suggests are signs of unsuccessful MIPs. The formation of the Five-Year Plan needs to be investigated.

Saudi Arabia is troubled by a security dilemma and an economic engine that is quite fragile. Uncertainty is high due to a crash in the world market of oil prices and a war with its neighboring country Yemen. The tenth year plan that would cover from 2015 to 2019 has been put on hold, reflecting how bad the situation is. And yet the

economic progress of the country is interlinked with the progress and success of the Five-Year Plans. A key issue is the revision of the plans implementation due to fluctuations within the oil market. The paper recommends that any formation of a Five-Year Plan and its decision makers must consider this aspect.

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