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Evaluating the Current Situation of VM in Saudi Arabia

Abdulrhman Alharbi[1], Haitham Alghamdi[2], Ehab Mlybari[3]
[1, 2, 3]Department of Civil Engineering, College of Engineering and Islamic Architecture, Umm Al-Qura University, Saudi Arabia

***Abstract*— *Objectives**: is to discuss the Value management (VM) methodology in Saudi Arabia to figure out the situation of VM, and evaluating the current situation of VM in Saudi Arabia, measuring the awareness of VM and its applications in both public and private sector, identifying the challenges and obstacles of the implementation VM studies worldwide and specially in Saudi Arabia. **Methods**: The researchers used two methods to reach the objective of the research, at first the literatures were reviewed, and the second method is spreading a questionnaire survey consist of 29 questions from the perspective of public and private sector started by the first part about the personal information, the second part is general information about the projects, the third part concerns with the general information about Value management and the final and the fourth part is the expert part. **Findings**: The researchers found that most of the engineer have the minimum required knowledge about value management but rarely any organization apply VM studies to their projects as the MoF resolution of applying VM for the project which exceed (20) Million Riyals. **Novelty**: After evaluating the current situation of value management in Saudi Arabia by the researchers. Five important recommendations were produced in order to increase the efficiency of value management within the projects and gaining its maximum benefits*.

***Keywords*—** *Value management (VM); private sector; public sector; Saudi Arabia*.

I. INTRODUCTION

The Value Methodology (VM) is a systematic and structured approach for improving projects, products, processes, services, and organizations. VM, which is used to analyze and improve manufacturing products and processes, design and construction projects, business and administrative processes, and both public and private sector services and organizations. VM helps achieve an optimum balance between function, performance, quality, safety and cost. The proper balance results in the maximum value for the project. Value is the reliable performance of functions to meet customer needs at the lowest overall cost (SAVE). The application of value management in Saudi Arabia began in 1981 and applied to almost all large military construction projects by the General Directorate of Military Works (GDMW). In 1982, the first VM training seminar was held in Riyadh, attended by 150 engineers. In 1985, GDMW set up their training department as a permanent program. In 1990, the training division was operated fully by Saudi-certified VM specialists. As an educational institution, King Saud University began teaching VM at the College of Engineering at post-graduate level as a construction course in 1988. The Saudi Council of Engineers launched the first training program in 1989 in the three largest cities – Riyadh, Jeddah and Dammam. For these courses, Dr. Stephen Kirk (a former SAVEI President) was the main instructor (Alyousefi et al., 1999). the Saudi Minister of Finance intended to encourage VM application by signing a resolution in 2002 ordering other public sector organizations to adopt VM in any governmental projects exceeding SR 20 million. The aim of the research is to evaluate the current situation of the VM in Saudi Arabia by presenting the obstacles which faces VM and providing recommendations to facilitate the adoption of VM in Saudi Arabia.Mohammed A S Alalshikh [1], presented the Obstacles of applying value studies in SPS which is: lack of awareness, knowledge or contentment about VM; lack of a VM team and qualified practitioners; the failure of the MoF to follow up on the resolution of applying VM. [2] The application of value studies in KSA started in 1986 AD, and it was found that it is an effective method for the qualitative improvement of the projects in design and construction phase while reducing the cost as much as possible and at the same time securing the required limit of performance and quality for the project requirements. Eng. Abdullah Hassan Ibrahim [2] There are many reasons for the failure of projects, but the most important of them is the difference vision of the contracting parties in the project. Dr. Khaled Abdel-Fattah Obeid [2], It is important to know that the best application of value engineering is during the initial design phase of the projects. Eng. Ali Alkhuwaiter [2] The success of Value Analysis / Value Engineering (VA/VE) study and the real value improvement depends upon how function analysis part of the study has been conducted. Eng. Muhammad Wali [2] the failure was attributed due to several reasons such as the lack of optimal use of resources and poor cost management. Eng. Abdulaziz Al-Yousifi's [3] The measure of the success of the value study is the amount of implemented proposals and the resulted savings. Dr. Diaa Tawfiqi [3]: 2019 Consulting offices, private or public institutions lack the required awareness and systematic study about value engineering and its requirements. Eng. Kamal Hosni Al-Qibli [3] - 2019 - discusses the importance of optimizing a high-quality product, even if its cost exceeds the cost of low-quality products significantly, in order to reduce the operational cost. Eng. Ali Al Hatila [3], the duration of the VM study take about 1% of the total project duration, but it contributes significantly to saving time, effort and money along with enhancing the quality of the project. [3] Value engineering applications in the Royal Commission of Jubail and Yanbu, the value engineering experience at the Royal Commission of Jubail and Yanbu has proven its success. Value studies have become integrated into project design schedules. Al-Yami [4] described many of the obstacles that contributed to preventing the adoption of VM in Saudi Arabia, such as the lack of sufficient data on VM, historical information, time standards,

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and lack of awareness about VM. In the construction sector in Malaysia, the most important obstacles were the lack of sufficient awareness of VM, the absence of government support, and the lack of experience in implementing VM. [5]. [6] in Malaysia have also confirmed this, this demonstrates that lack of knowledge, resistance to change among the parties and conflicting project goals between those parties are the major issues facing the VM workshop. [7] Kissi et al. identified 4 major obstacles in the construction sector in Vietnam, including lack of qualified people, lack of sufficient awareness, difficulty in implementing workshops, and lack of records for implementing value management. [8] and five key components were identified. This components provide obstacles to the VM team's implementation challenges, technical concerns and impediments in developing economies. A recent state study founded that lack of awareness of the training and public knowledge of stakeholders are the significant challenges faced by VM adoption in the South African construction industry [9]. Idris Othman et al. [10] shows the critical barriers of value management (VM) implementation in the Egyptian construction industry are inadequate facilitation of skills and training, and difficulty in the involvement of decision-makers and other key partners in the VM workshop. Luvara and Mwemezi [11] also assessed the most significant obstacles to VM adoption for public buildings in Tanzania: lack of knowledge, wrong paths of procurement, and a lack of qualified skills. In China , Cheah and Ting [12] concluded that it is possible to implement VM, and the most important obstacles are the lack of sufficient experience and clear technical standards. In Sri Lanka, the application of VM is new and has not appeared seriously in the construction sector [13]. Fard et al. [14] In Iran, they examined 5 factors that prevent the implementation of VM in the construction sector, including outdated standards, traditional thinking, lack of knowledge and awareness, negative ideas, practices adopted in the construction industry, and lack of local guidance. Whyte and Cammarano [15] In another study in the engineering sector in Australia, looking at infrastructure projects to implement VM, the study considered that time constraints, lack of understanding and participation of all members of the team have bad consequences on the success of the VM workshop.

II. Data Collection and Data Analysis

A questionnaire survey was constructed by the researchers to measure the awareness of Value management, its applications and the benefits of implementing it in Saudi Arabia, the survey consist of (29) question started by collecting the personal information of the 138 participants along with measuring the awareness of the basic information about the cost of the projects, VM and its applications and a view specialized questions for the experts, therefore the questionary was divided into four part.

2.1 Part One: Personal Information of the Participants

The total number of the participants is 138, they were asked to answer seven personal questions the percentage of the participants age (20-25) years is 4%, (26-30) is 32%, (31-40) is 36% and (41-50) is 18% and 10% are more than (50) years old. the participants are mostly males with a percentage of 92% and the females are only 8%. The work sector shows that 35% are working in the public sector (government), 9% in the semi-public sector, 49% in the private sector, 3% are unemployed and 4% are students. The participants experience, 22% have (1-5) years of experiences, 27% have (6-10) years of experience, 29% have (10-20) years of experiences, 29% have (20-30) years of experiences, while 17% with an experience of more than 30 years. 80% of the participants are engineers and 20% are majoring and different discipline. the education of the participants, 1% have a High-school degree,2% with a Diploma, 68% with a bachelor's degree, 25% holding a Master degree and 4% with a Phd degree.,95% are living in Saudi Arabia and 5% outside Saudi Arabia. Table1 Summarize Part one.

TABLE 1. Personal Information of the Participants

	Item	Frequency, *f*	Percentage
1	Age		
-	20-25	6	4%
-	26-30	44	32%
-	31-40	50	36%
-	41-50	24	18%
-	Greater than 50	14	10%
		Σ*f* = 138	
2	Gender		
-	Male	127	92%
-	Female	11	8%
		Σ*f* = 138	
3	Experience		
-	None	7	5%
-	1-5 Years	31	22%
-	6-10 Years	37	27%
-	11-20 Years	40	39%
-	More than 20 years	23	17%
		Σ*f* = 138	
4	Work-Sector		
-	Public sector	49	35%
-	Semi-public sector	12	9%
-	Private Sector	68	49%
-	Unemployed	4	3%
-	Student	5	4%
		Σ*f* = 138	
5	Major		
-	Engineering	110	80%
-	Other	28	20%
		Σ*f* = 138	
6	Education		
-	High School	2	1%
-	Diploma	3	2%
-	Bachelor's	94	68%
-	Master	34	25%
-	PhD	5	4%
		Σ*f* = 138	
7	Residence		
-	KSA	131	95%
-	Outside KSA	7	5%
		Σ*f* = 138	

2.2 Part Two: General information about the projects

Part two concerns with measuring the basic awareness of project's cost, 68% participants think that the cost is exaggerated, 16% think it's reasonable and 16% don't know. Among the participants who think the cost is exaggerated, 83%

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are aware of the market prices, 17% are not. 76% have participated in the designing and implementation of the project, while 24% did not. 88% of them were involved in a work field project and 12% were other types of projects. 45% of the participants have worked as project managers, 42% were employees in the project and 13% were the final users of the project.90% think that cost can be reduced while maintaining quality, 6% it cannot be done and 4% do not know. 67% of the people have heard of VM term and 33% never did. the mean of knowing the VM is training courses for 43% of the participants, university course for 10%, general knowledge for 30%, 3% consider themselves as specialized experts and 14% all the above. Table2 summarize part two.

TABLE 2. General info about the project's cost

	Item	Frequency, *f*	Percentage
8	In general, do you think that the cost of projects is exaggerated?		
-	Yes	94	68%
-	No	22	16%
-	I do not know	22	16%
		Σ*f* = 138	
9	If the answer is yes, are you aware of the market prices?		
-	Yes	78	83%
-	No	14	15%
-	I do not know	2	2%
		Σ*f* = 94	
10	Have you ever participated in the design or implementation of a project?		
-	Yes	105	76%
-	No	33	24%
		Σ*f* = 138	
11	If the answer is yes, what is the type of project?		
-	work-field	92	88%
-	personal project	8	7%
-	Other	5	5%
		Σ*f* = 105	
12	If the project is affiliated with your work-field, what is your role in the project?		
-	Project Manager	41	45%
-	Employee	39	42%
-	Beneficiary	12	13%
		Σ*f* = 92	
13	Is it possible to reduce project cost while maintaining quality?		
-	Yes	124	90%
-	No	9	6%
-	I do not know	5	4%
		Σ*f* = 138	
14	Have you ever heard the term value management VM or value engineering VE ?		
-	Yes	93	67%
-	No	45	33%
		Σ*f* = 138	
15	If the answer is yes, How did you gain the knowledge of value management VM?		
-	Training course	40	43%
-	A course	9	10%
-	General culture	28	30%
-	specialist (expert)	3	3%
-	All the above	13	14%
		Σ*f* = 93	

2.3 Part three: General information about VM

Participants who have heard about VM based on Q14 will be directed to this part, 79% of the participants think that VE is part of VM (which is the correct answer) while 6% think it's not and 15% do not know. 69% think VM is not a feasibility study (correct), 24% thinks it's a feasibility study while7% do not know. 96% think VM is necessary for the projects and 4% think it's not. 86% believe that VM should be mandatory for projects, while 12% think it shouldn't and 2% don't know.

TABLE 3. General information about VM

	Item	Frequency, *f*	Percentage
16	Is value engineering VE part of value management VM ?		
-	Yes	73	79%
-	No	6	6%
-	I do not know	14	14%
		Σ*f* = 93	
17	Is the VM study a feasibility study?		
-	Yes	22	24%
-	No	64	69%
-	I do not know	7	7%
		Σ*f* = 93	
18	Do you think that VM studies are necessary for projects?		
-	Yes	89	96%
-	No	4	4%
-	I do not know	-	-
		Σ*f* = 93	
19	Do you support the mandatory application of VM studies to projects?		
-	Yes	80	86%
-	No	11	12%
-	I do not know	2	2%
		Σ*f* = 93	
20	What is the main purpose of the VM study?		
-	Cost reduction	19	21%
-	Achieving the function with the least amount of resources	69	74%
-	Feasibility study	4	4%
-	I do not know	1	1%
		Σ*f* = 93	
21	What is the minimum project cost for application VM studies?		
-	million riyals	16	17%
-	5 million riyals	19	20%
-	10 million riyals	5	5%
-	20 million riyals	11	12%
-	30 million riyals	-	-
-	More than 30 million riyals	7	8%
-	I do not know	35	38%
		Σ*f* = 93	
22	Does your work-sector do VM studies?		
-	Yes	27	30%
-	No	44	47%
-	I do not know	22	23%
		Σ*f* = 93	
23	If the answer is yes, what is the percentage of projects in which VM studies have been applied?		
-	(1-10)%	6	22%
-	(11-25)%	4	14%
-	(26-50)%	5	18%
-	More than 50%	8	30%
-	I do not know	4	15%
		Σ*f* = 27	

Discuss the purpose of the VM studies, 21% think it's a cost reduction methodology, 74% believe the purpose is achieving the function with minimum resources (correct), 4% think it's a feasibility study while 1% don't know. and about the minimum cost for the mandatory of VM, 17% think it 1 million, 20% think its 5 million, 5% think its 10 Million, 12% believe it 20 Million (correct), 8% think it's more than 30 million and 38% don't know. and question if the participant work sector applies VM,

30% apply VM, 47% don't and 23% don't know. The ones who said their work sector apply VM, 22% believe it applicable for (1-10)% of the project, 15% for (11-25)% of the projects,18% for (26-50)% of the projects, 30% for more than 50% and 15% don't know. 100% of the participants believe it's feasible compared to its cost. Table 3 summarize the answers.

TABLE 4. Experts

	Item	Frequency, *f*	Percentage
24	Is the cost of the VM study feasible compared to what results from its implementation?		
-	Yes	16	100%
-	No	-	-
		Σ*f* = 16	
25	What is the most important phase of the project life cycle to applying VM studies?		
-	Project concept	4	25%
-	Scheme design	8	50%
-	Detailed design	4	25%
-	Implementation	-	-
-	Operating and Maintenance	-	-
		Σ*f* = 16	
26	From your point of view, what is the most important phase in the VM study?		
-	Team selection	-	-
-	Collect information	3	18%
-	Function analysis	3	19%
-	Creativity/ Speculation	4	25%
-	Finding alternatives	3	19%
-	Ideas evaluation	-	-
-	Recommendations	-	-
-	Implementation	3	19%
		Σ*f* = 16	
27	What is the best VM team ?		
-	Internal team	3	19%
-	Internal team but independent of the project	1	6%
-	External team	2	12%
-	Internal team and external experts	10	63%
		Σ*f* = 16	
28	Have you ever participated in a VM study?		
-	Yes	11	69%
-	No	5	31%
		Σ*f* = 16	
29	If the answer is yes, did the VM study achieve its objectives?		
-	Yes	10	91%
-	No	1	9%
		Σ*f* = 11	

2.4 Part four: Experts

25% of the participants believe the project concept phase is the most important phase for VM, 50% believe it's the preliminary design phase, while 25% believe it's the detailed design phase. 18% believe the data collection phase is the most important phase of VM, 19% believe it's the function analysis phase, 25% believe it's the creativity phase, 19% think its alternative finding phase while 19% believe it's the implementation phase. 19% believe the best team for VM is the internal team of the project, 6% believe it should be a team of the same organization but dependent from the project, 12% think it should be from outside the project while 63% believe the team should be from inside and outside the project.69% have participated on VM studies and 31% never had. Table 4 summarize the answers.

III. DISCUSSION

Comparing the literature by the data collected by the questionnaire confirm that there is a clear gap between knowledge of Value management methodology and the application of this knowledge in Saudi Arabia, from the results of the questionnaire, we find agreement in most of the ideas with previous researchers on the same subject and differences in some ideas, but the main problem is the lack of systematic application of value management standards in the Kingdom and we also found that even experts in this field differed among themselves, some of them believe the project concept phase is the most important phase for VM, others believe it's the preliminary design phase, and others believe it's the detailed design phase importance in the success of projects, some of experts believe the data collection phase is the most important phase of VM, other believe it's the function analysis phase, other believe it's the creativity phase, think its alternative finding phase while other believe it's the implementation phase, so clear rules and foundations should be established for value management in the Kingdom and increase Awareness of its, and the researchers suggest future research to investigate the reasons that hinder or minimize the application of this knowledge in Saudi Arabia.

IV. RECOMMENDATIONS

1. Adding a course (value management) in the study plans for all engineering disciplines, for the great benefit of engineers in knowing the basics of this knowledge and the importance of its practice and application.
2. Promoting VM studies by increasing the awareness of the decision makers about the benefits of applying VM studies.
3. A mandatory Adding the value study at the design stage of the projects.
4. Organizations need to set up their own VM departments in the organization structure that can implement VM studies internally.
5. Motivate the organizations that apply VM to their project.
6. Working on adding a target such as applying VM to all the project by 2025.
7. Suggesting future research to investigate the reasons that hinder or minimize the application of VM in Saudi Arabia.

V. CONCLUSION

Through this research, we conclude that Saudi Arabia have a significant number of engineers who have the minimum required knowledge of Value Management methodology and the benefits of its application, but there is a lack of applying this knowledge within the organizations, so increasing the awareness of the decision makers found to be the most important factor to get the benefits Value management.

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