3.1 Research Methodology:

The study had been conducted through several phases namely literature review, data collection, data analysis, discussion and conclusion. A literature review was conducted encompassing all various means available to obtain the widest range of the relevant information from books, papers, previous researches and websites related to the value engineering and how much it's useful and when and why we can use it in the companies.Data analyzed by using statistical analysis (**SPSS statistic).**

3.2 Data Collection:

A Questionnaire was used to obtain the data needed for research because it is one of the most important tools to collect the primary data and use it to achieve the purposes of research.

The data collection is based on 50 returned questionnaires in 2 month, which Distributed to a group of construction companies.

The targeted respondents are mange director, director, assistant director, senior engineer and site engineer.

3.3 Questionnaire Design:

The questionnaire (attached as an appendix to this research) was include generall information about respondents,aware about Value Engineering,the participated of Value Engineering,if the companies use Value Engineering as a system,the lack of knowledge about Value Engineering and how solve this lack.

3.4 Data analysis

The questionnaire was analyzed using statistical analysis (SPSS statistic) to obtain an overview of application value engineering in Sudan.

And used **yes** or **no** mode to determine if there is aware about value engineering, if the companies use value engineering as a system and if there is lack of value engineering knowledge or no.

And there questions answered by choosing an options and make percent for any options which it's choosing by respondents.

3.4.1The awareness of the Value Engineering Concept:

Figure(1.3) show the awareness of value engineering concept. Analysis of the questionnaires showed that (62%) have awareness about value engineering concept and (38%) doesn't have any aware about value engineering concept.

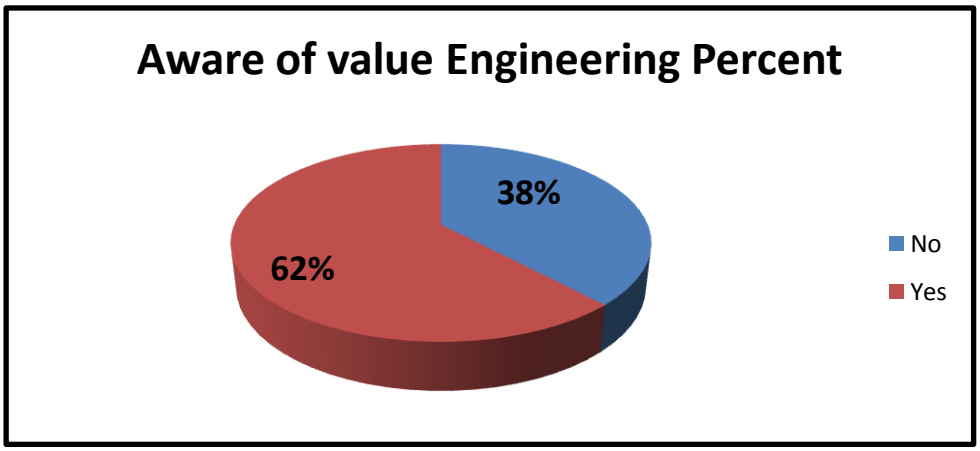


Fig.(1.3): The awareness of the concept of value engineering. Researcher

	Frequency	Percent	Valid Percent	Cumulative Percent
No	19	38.0	38.0	38.0
Yes	31	62.0	62.0	100.0
Total	50	100.0	100.0	

Table (2.3): The aware of the concept of value engineering, Researcher

3.4.2 The ways which the respondents hearing about Value Engineering in the first time:

Figure(2.3) show the way which the respondents hearing about value engineering in the first time, the researcher put four options for this question, the options is Professional Institution, Within their company, an academic establishment or from training course that they attended, Via an industry newsletter or via online media such as the internet.

The highest percent is hearing from an industry newsletter or via online media such as the internet **(22%)** ,the lowest percent is **(12%)** for an academic establishment or from a course that they attended and for the Professional institution.

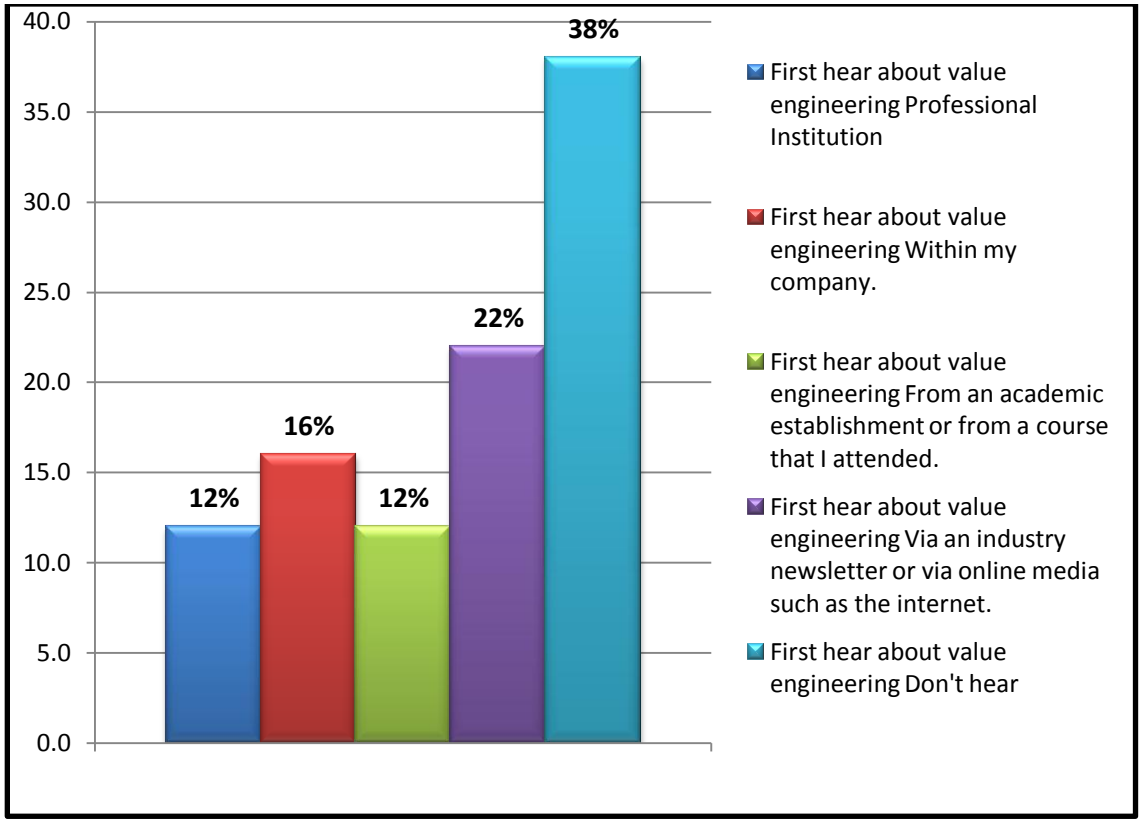


Fig.(2.3): The ways which the respondents hearing about value engineering in the first time.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Professional Institution	6	12.0	19.4	19.4
	Withintheir company.	8	16.0	25.8	45.2
	From an academic establishment or from a course that I attended.	6	12.0	19.4	64.5
	Via an industry newsletter or via online media such as the internet.	11	22.0	35.5	100.0
	Total	31	62.0	100.0	
	Not hearing	19	38.0		
Total		50	100.0		

Table(3.3):The ways which the respondents hearing about VE(frequence)

3.4.3 The participated in a Value Engineering exercise:

Figure(3.3) shows the participation in a value engineering exercise, in this question the researcher use the **yes** or **no** mode.

Frequency there is **44** respondents don't participate the value engineering system and there is **6** respondents participate the value engineering.

By percent, don't participate the value engineering **(88%)** and **(12%)** for who participate the value engineering.

From this high percent, there is a lot of respondents don't participant value engineering, so must make this system known and have to be use.

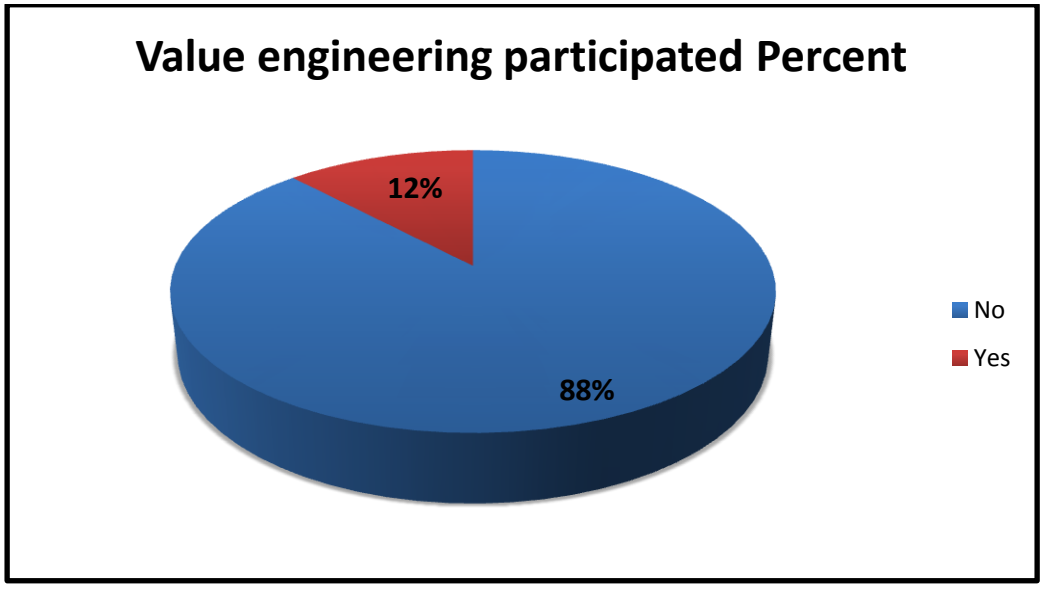


Fig.(3.3): The Participated Of Value Engineering exercise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	44	88.0	88.0	88.0
	Yes	6	12.0	12.0	100.0
	Total	50	100.0	100.0	

Table (4.3): The Value engineering participated(Frequency)

3.4.4 The Time When the Respondents Involved Value Engineering Exercise:

Figure(4.3)shows the time when the respondents involved a value engineering exercise, (12%) of respondents involved the value engineering since 2000, but (88%) don't involve value engineering. this percent show there is weak involvement.

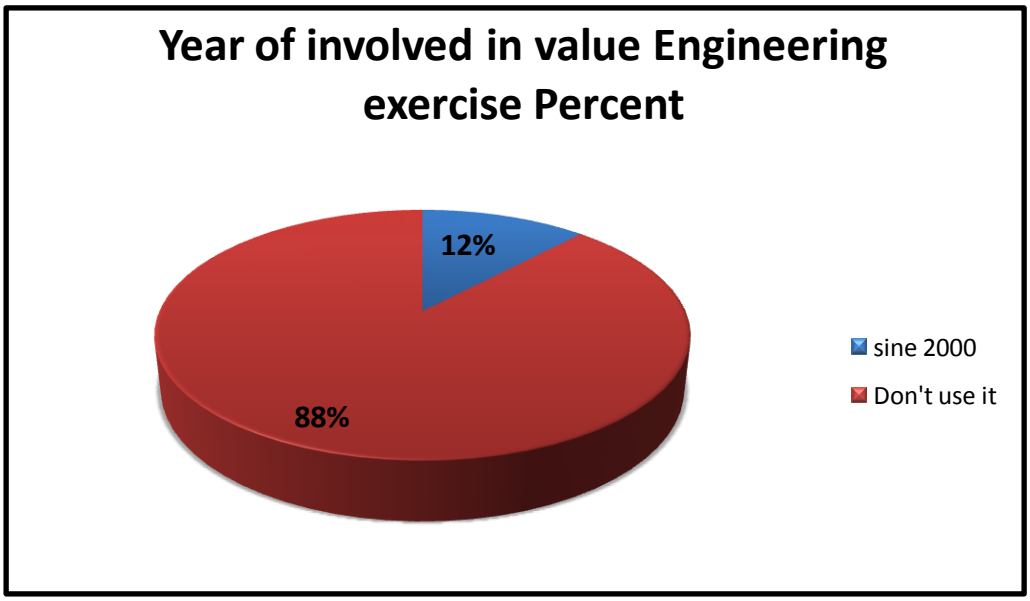


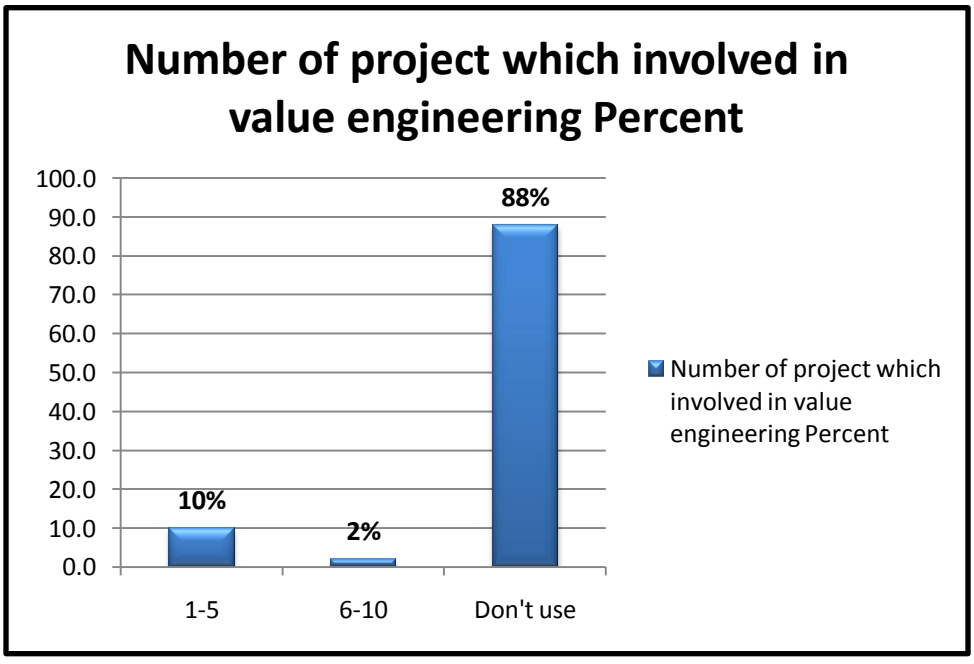
Fig.(4.3):The Year of involved in value engineering exercise Percent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	sine 2000	6	12.0	100.0	100.0
Missing	System	44	88.0		
Total		50	100.0		

Table(5.3): Year of involved in value engineering exercise(Frequency)

3.4.5 The number of projects in which the respondent used the value engineering:

Figure (5.3) show the number of the projects which the respondents used the value engineering, from figure 5 we see there is **(10%)** using from 1-5 projects and just **(2%)** using value engineering in 6-10 projects. From those percent we note there is **(80%)** don't use value engineering in any project.



Fig(5.3): Number of project which involved used value engineering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	5	10.0	83.3	83.3
	6-10	1	2.0	16.7	100.0
	Total	6	12.0	100.0	
Missing	System	44	88.0		
Total		50	100.0		

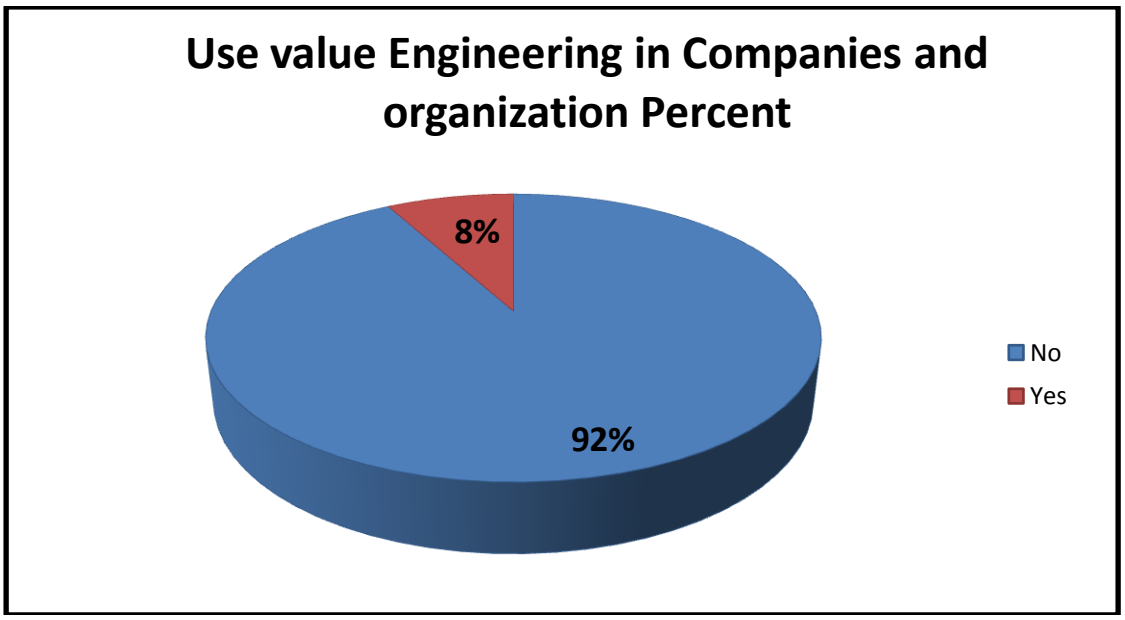
Table(6.3):Number of project which involved used value engineering

3.4.6 The Value Engineering using in the companies and Organization:

In this question, the researcher wants to know if the value engineering is used in the companies or not.

Figure(6.3) shows the percent of this question and there is just (8%) using value engineering as a system in their companies so it's very low percent and we will show the reasons of this percent in the next question.

(92%) don't using the value engineering in their companies, so there is lack of using value engineering in the companies.



Fig(6.3): Use value engineering in companies and organization Percent

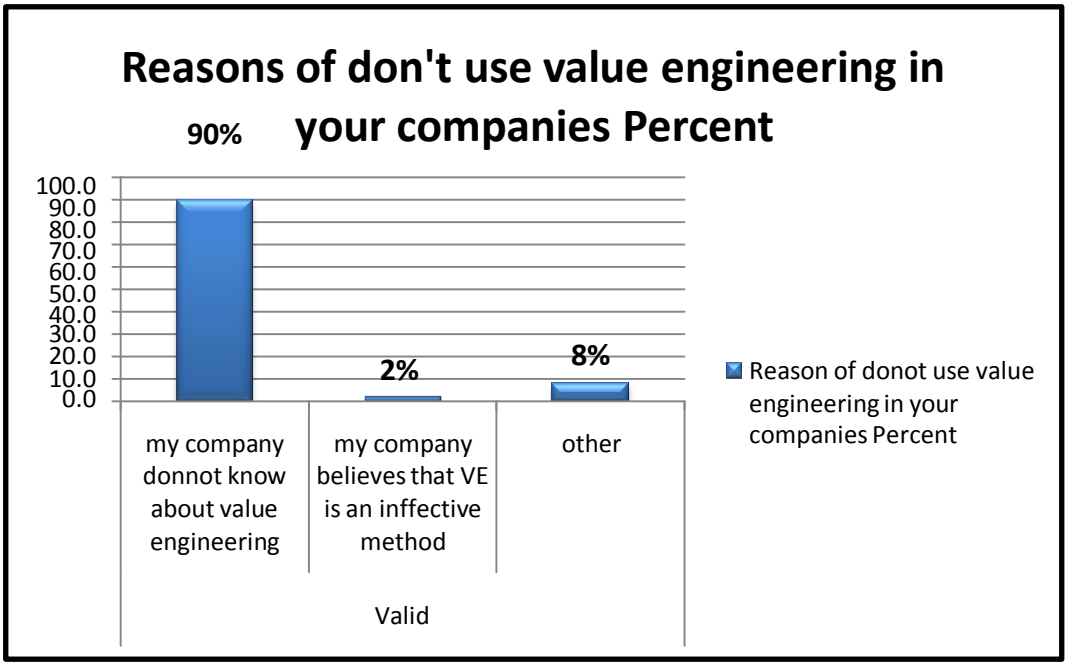
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	46	92.0	92.0	92.0
	Yes	4	8.0	8.0	100.0
	Total	50	100.0	100.0	

Table(7.3):Use value engineering in companies and organization(Frequency)

3. 4. 7 The Reasons of Don' t Use Value Engineering as a system or Method in the Companies:

In this question, the researcher make some options for the reasons which make the company don't use the value engineering as a system or method in the companies, the options are (if their company does not know about value engineering, if their company has another system, if their company believes that VE is an ineffective method and the last option was open according to the respondents opinion.

Figure(7.3) show the high reason percent is their company does not know about Value engineering **(90%)** and their company believes that VE is an ineffective method reason take **(2%),(8%)** for another reasons including (they plan to apply value engineering in their company system). From this high percent we note there is lack of knowledge about value engineering in the companies, which mean there is many companies have no idea about value engineering.



Fig(7.3): The reason s of don't use valu e engineering as asystem or methodin the companies.

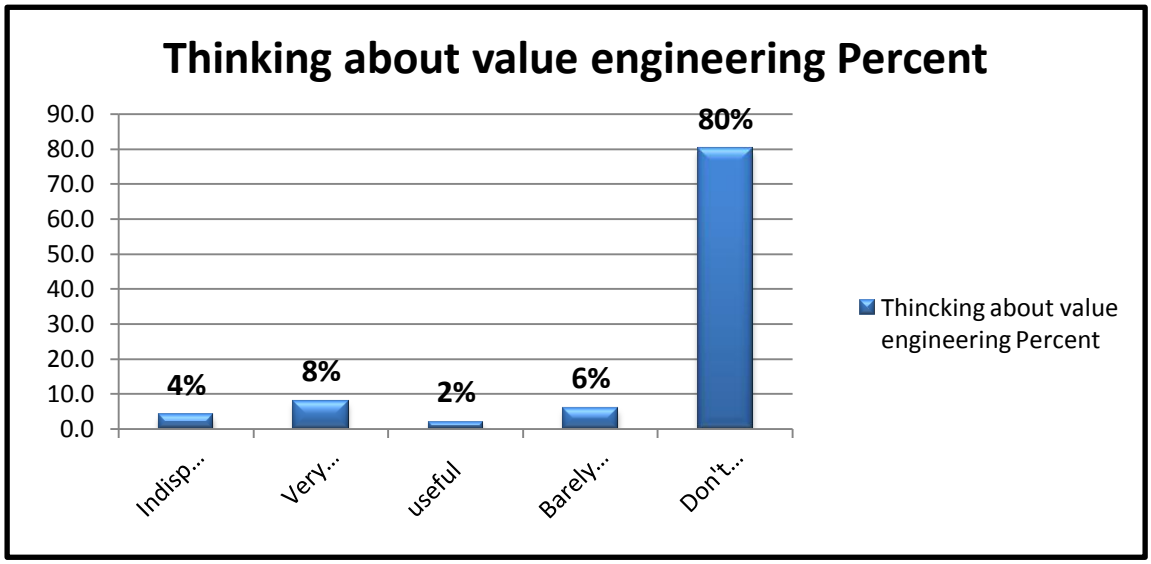
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	my company donnot know about value engineering	42	84.0	91.3	91.3
	my company believes that VE is an inffective method	1	2.0	2.2	93.5
	Other	3	6.0	6.5	100.0
	Total	46	92.0	100.0	
Missing	System	4	8.0		
Total		50	100.0		

Tabe(8.3):Th e reason s of don't use valu e engineering as asystem or method in the companies(Frequency).

3.4.8 The value engineering useful as a tool/methodology:

In this question the respondents indicated if the value engineering useful as a tool, Indispensable, Very useful, sometimes useful, barely useful or if it is not useful at all.

The analysis show there is **(8%)** see it's very useful, **(6%)** see it's barely useful, **(4%)** see the value engineering Indispensable and should be used on all projects, **(2%)** see value engineering useful and there is **(80%)** don't know how much value engineering useful because they don't have any knowledge about value engineering or they never use value engineering in the projects.



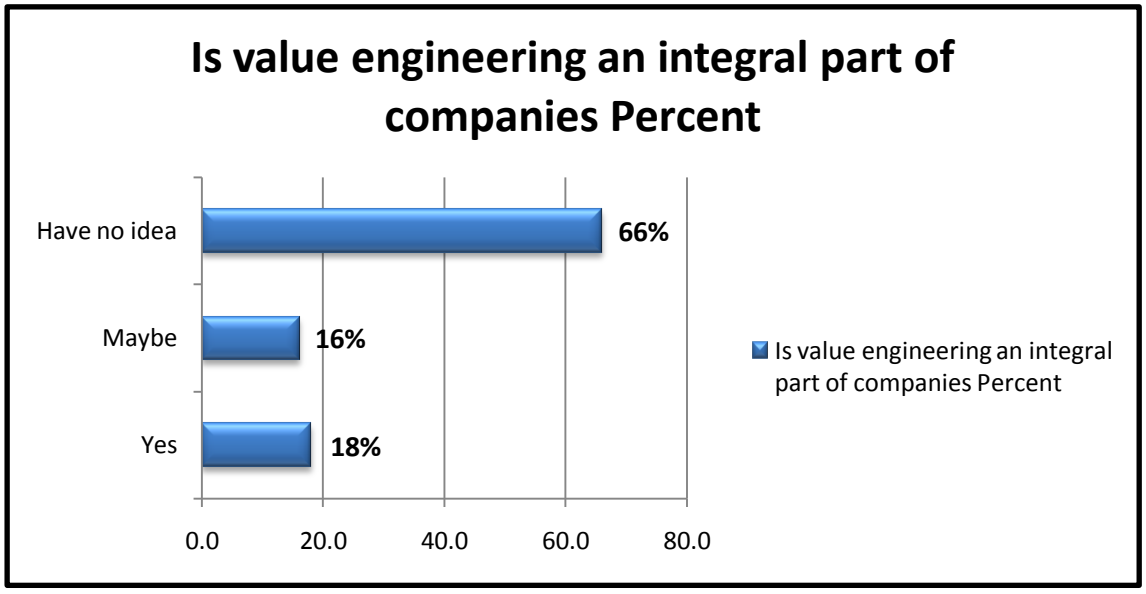
Fig(8.3):Thinking about value engineering Percent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Indispensable	2	4.0	20.0	20.0
	Very useful	4	8.0	40.0	60.0
	Useful	1	2.0	10.0	70.0
	Barely Useful	3	6.0	30.0	100.0
	Total	10	20.0	100.0	
	Have no idea	40	80.0		
Total		50	100.0		

Table(9.3):Thinking about value engineering(Frequency)

3. 4. 9 The Thinking about Value Engineering if it's an integral part of companies:

Figure(9.3) show the percent if the value engineering is an integral part of companies or not, the respondents indicated **(18%)** yes value engineering it's an integral part of companies, **(16%)** see maybe and **(66%)** don't know and haven't idea because they don't have knowledge about value engineering concept.



Fig(9.3):If value engineering an itergal part of companies or not.(Percent)

Is value engineering an integral part of companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	18.0	52.9	52.9
	Maybe	8	16.0	47.1	100.0
	Total	17	34.0	100.0	
Missing	System	33	66.0		
Total		50	100.0		

Table(10.3) : If value engineering an itergal part of companies or not(Frequency)

3.4.10 lack of knowledge about Value Engineering:

This question help to know if there is lack of knowledge about value engineering or not, the analysis show there is **(90%)** of respondents see there is lack of knowledge about value engineering, **(2%)** see maybe there is lack of knowledge about value engineering and there is **(8%)** don't know if there is lack of knowledge or not.

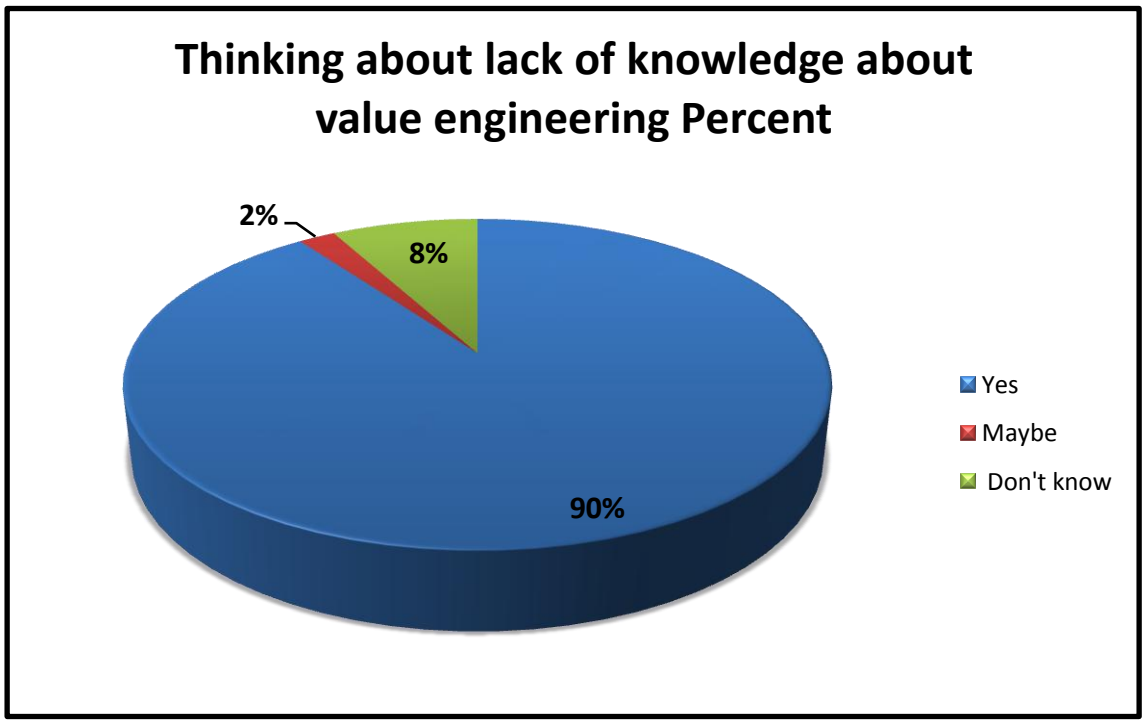


Fig (10.3): Lack of knowledge about value engineering percent

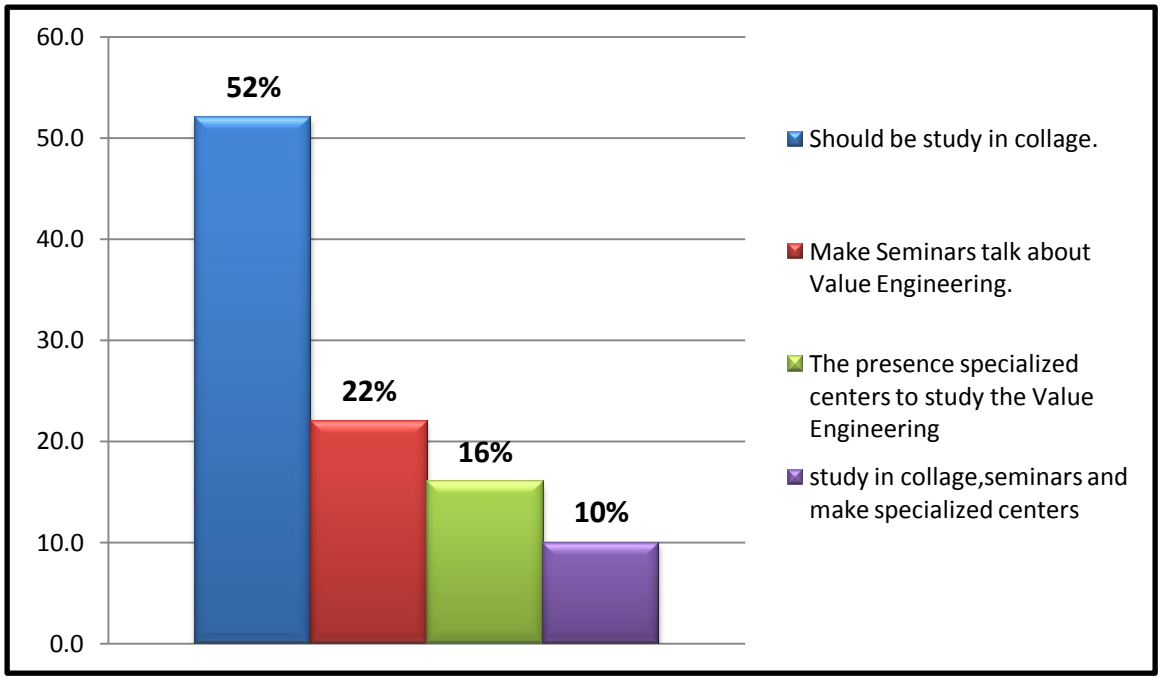
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	45	90.0	90.0	90.0
	Maybe	1	2.0	2.0	92.0
	I don't know	4	8.0	8.0	100.0
	Total	50	100.0	100.0	

Table(11.3):Thinking about lack of knowledge about value engineering(Frequency)

3.4.11 The ways which make value engineering knowledge know:

There is **(90%)** of respondents see there is lack of value engineering knowledge, the researcher make some solutions of this problem , the solutions which the researcher suggest are (Should be study in collage, Make seminars talk about value engineering or make specialized centers to study the value engineering.

Figure (10.9) show there (52%) from respondents see the solution of this lack it's to make value engineering study in collage, (22%) suggest the solution of this lack is to make seminars talk about value engineering, (16%) suggest the solution of this lack is to make specialized centers to study the value engineering and (10%) from respondents see the solution of this lack it's to make value engineering study in collage and make seminars talk about value engineering and make specialized center to study the value engineering.



Fig(11.3): The Solutions to make Value Engineering Known(Persent)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Should be study in collage.	26	52.0	52.0	52.0
	Make Seminars talk about Value Engineering.	11	22.0	22.0	74.0
	The presence specialized centers to study the Value Engineering	8	16.0	16.0	90.0
	study in collage,seminars and make specialized centers	5	10.0	10.0	100.0
	Total	50	100.0	100.0	

Table (12.3): The Solutions to make Value Engineering Known(Frequency)