CHAPTER (4)

PROPOSAL OF SYSTEM DESIGN ELEMENTS AND ANTICIPATED SIGNIFICANCE

4.1 INTRODUCTION

This chapter is divided in to two parts, the first part is concerning the suggested software for work flow collecting different parameters and suggestions for best results, and the second part is about questionnaire made about thesis topic including analysis, results and user feedback.

4.2 PART 1: SMART OIL EXPLORATION SOFTWARE

Smart oil exploration interface, is an interface designed for the user as a guide to select satellite image that will be suitable for specific project.

4.2.1 Smart Oil Exploration Software Description

The main issue in this section is to develop and implement the theoretical solution described in chapter 2; this includes identifying the requirement to handle such a process, and designing and modifying the interface component and the system workflow to meet the requirement for this case.

The primary interface function is to manage, analyze cases data, to introduce a guide for the user to select the suitable satellite images, get a primary rank for the project based upon the available information about the study area, the target from using satellite images and finally the suggested budget for this issue.

4.2.2 Interface Tools

The primary interface is composed of tow tabs; the first tab is the descriptive data for the study area (concession) which will enable the user to categorize the data that describe the area of interest, and this is composed of 4 boxes:
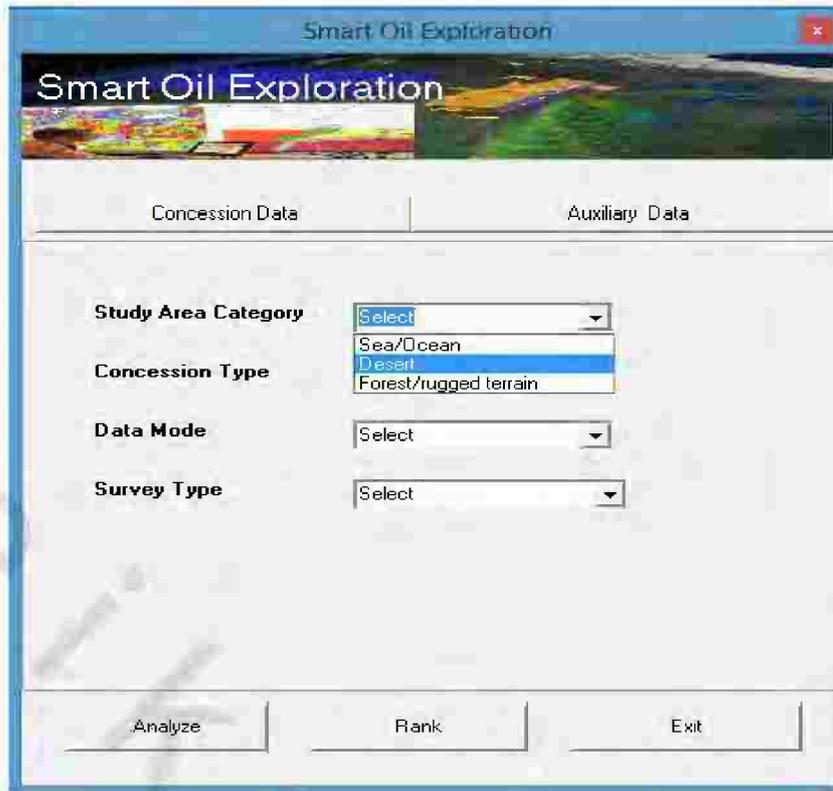
- Study Area category
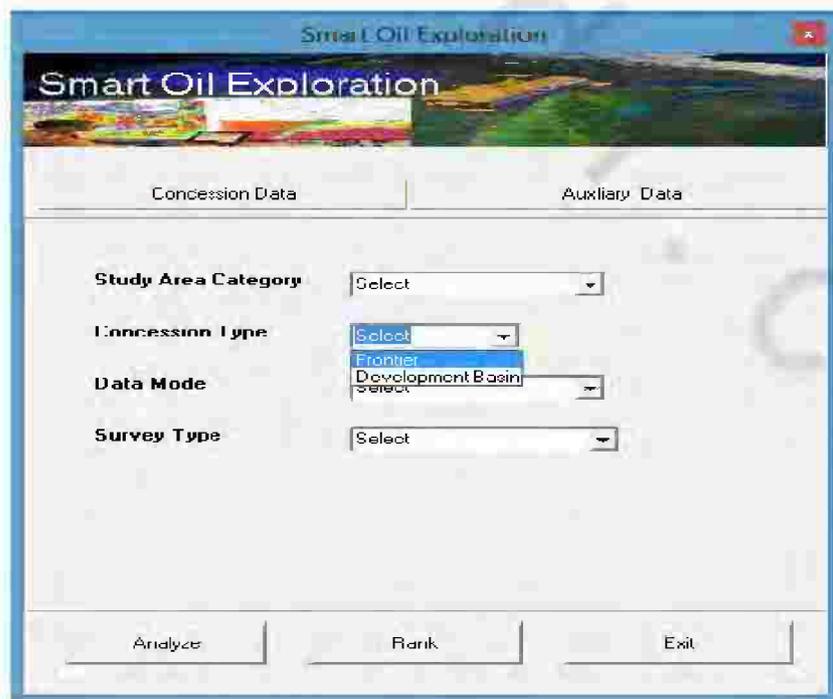- Concession type
- Data Mode
- Survey type

Study Area category including three options:

- Desert
- Sea/Ocean
- Forest/Rugged terrain

Concession type may be Frontier area which have no available information or have not been accessed before, and development basin which data about concession area are available or may be the target is the expansion of existing basin.

Data Mode is regarding the satellites images mode that user decided to use for the project, and the selection based mainly upon budget and the status of the concession area.

Modes may be [single satellite image – Multi temporal satellite images – Multi source satellite images – multi temporal and multi source satellite images(both)] (described details in chapter 3).
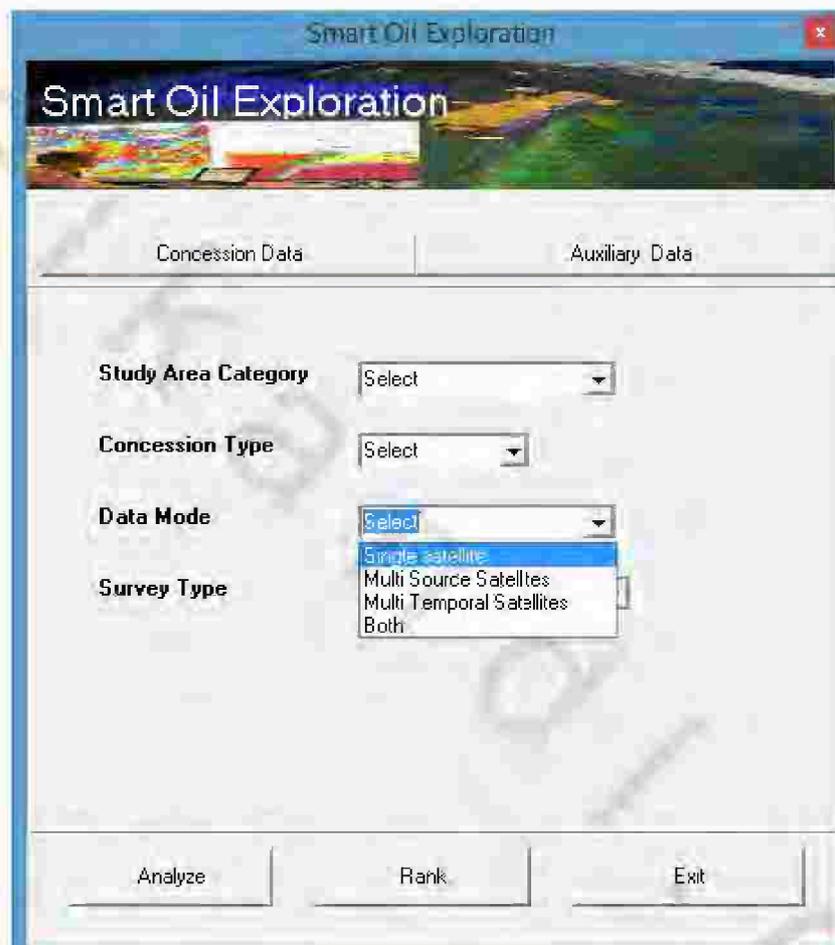
Survey type is categorized to seismic survey and non- seismic survey study and this information serves for the orientation of ranking path with other factors that is because the seismic data is very important auxiliary data with satellite images.

The second tab is the request about the existing data available about the concession area, this serves as a very important parameter because the existing data may change the path of selecting satellites completely and also to accurately express about the project rank.

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4.2.3 Project Analysis and Ranking Using Smart Oil Exploration

The first step is to select from the dropdown lists the suitable choices that describes the real data.

The next step is to check the checkboxes that suits the user's available data.

Now , the user is ready for getting results , the next step is clicking the button named "Analyze" , this will make analysis for data entered by user and then the user will get a message box including the suggested suitable satellite images for the project.
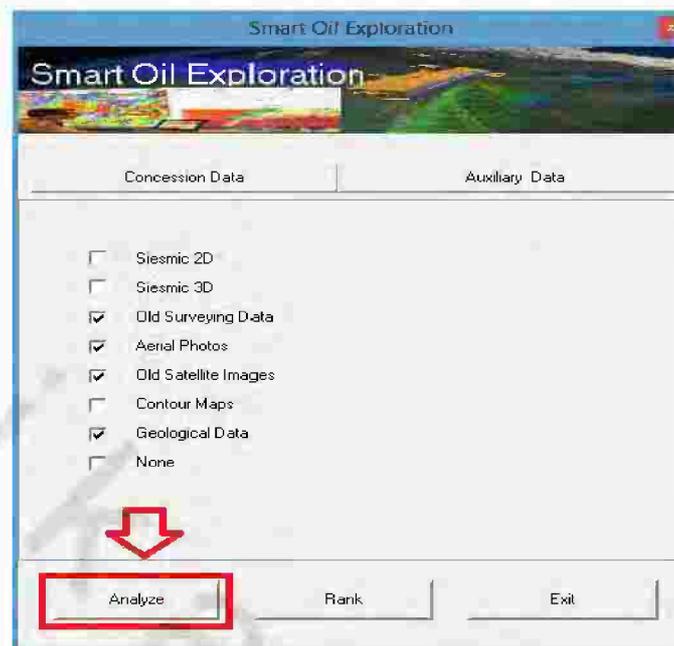
This is a sample of what user may receive about this issue.
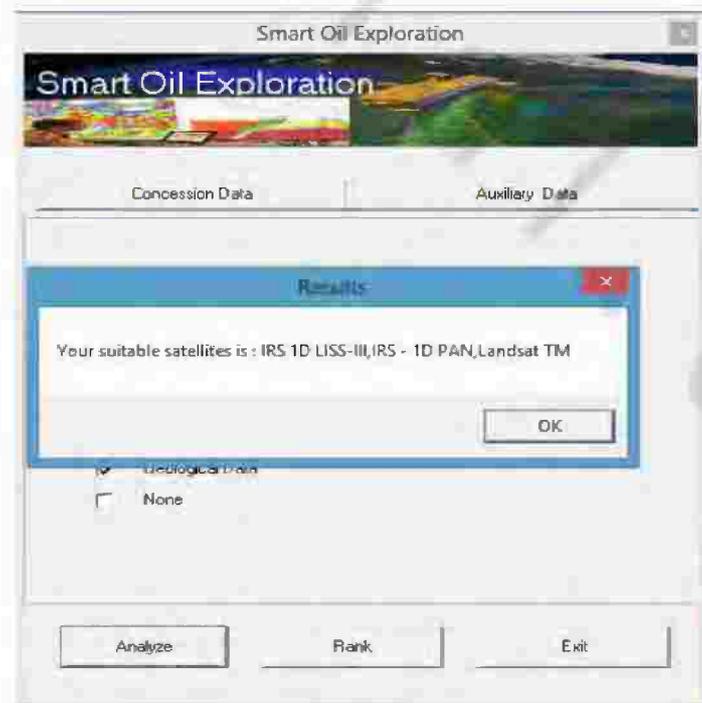
Now we are back again to the auxiliary data window, the user has option to change selection any time. The next step is to get the rank of the project, by clicking the button named "Ranking".
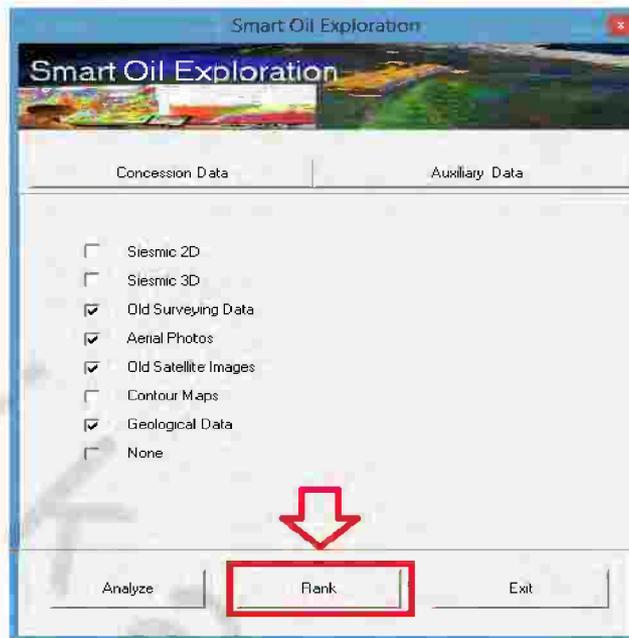
This is a sample of what user may receive.

4.2.4 Summary: the primary interface is only for data management and will be recommended to recover more specific parameters and to have more analysis options to introduce accurate results about the probability of oil existence according to data available.

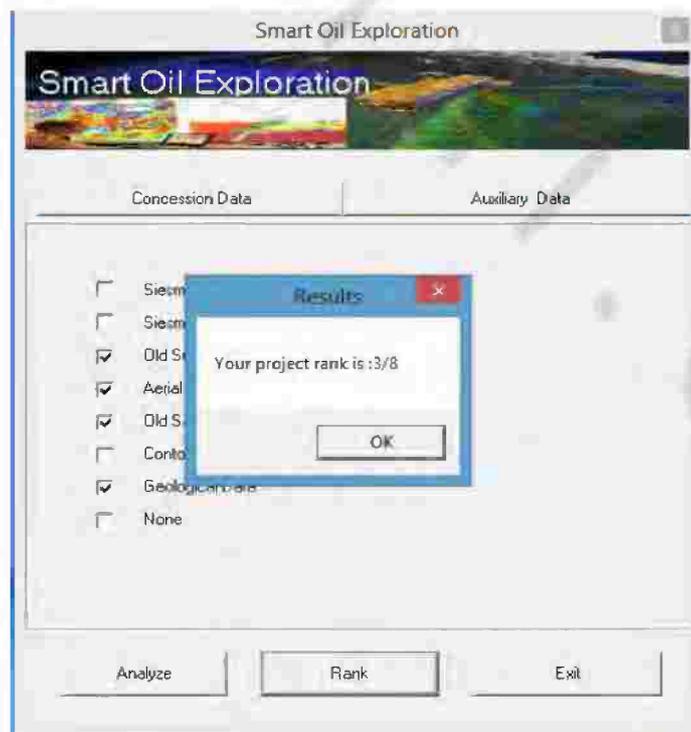# 4.3 PART 2: QUESTIONNAIRE

A questionnaire was designed and sent for oil companies and feedback was analyzed in this section.

4.3.1 Link and Collaboration between Research and Oil Exploration Industry

It is necessary to build strong relationships between universities and companies. While universities and industry have different missions and cultures, there are mutual benefits to these collaborations. Therefore, if both universities and industry are more creative and flexible when approaching collaborations it will lead to stronger results.

Actually, people must do more to bridge the gaps between universities and industry. Universities bring a lot to the table: rigorous research methods and standards, access to a wide variety of resources from physical infrastructure to outside-in perspective of creative and energetic minds, and much more.

For this issue it was suggested to make a survey about the use of satellite images for oil exploration in Egyptian oil companies to reflect the industrial point of view about this subject.

4.3.2 Questioner and oil industry member's feedback

1. A questionnaire has conducted to get people's opinions on how and what should be put in my research and application. Firstly 30 people were asked, these included exploration managers, reservoir engineers, project managers and geological expertise to fill out questionnaire. They all did this independently and anonymously to ensure the responses were honest and were not influenced by other peoples decisions. After all of

my 30 responses were received, feedback was analyzed and created visual pie charts on Microsoft Excel so that the results were easy to read, this enabled to construct charts using the information that obtained. This allowed making easy decisions. then transferred the charts onto Microsoft PowerPoint to create presentation, so that could conclude the results, in addition a brief summary have written underneath each chart describing findings and explaining what will be doing In research from the received feedback.

2. Things will take into consideration while performing research, which was influenced by feedback: target users will be exploration expertise in different managerial levels (section heads – department managers …etc) Work experience (10-20 years). Companies that were interested in this research are mainly exploration companies.

3. **How well do you understand our method idea?** 30% Don't Understand , 10% Somewhat understand 20% understand 40% understand very well , the majority of people that understand the method are specialized in oil exploration and less people in production and petrochemical companies were interest.

How well do you understand our method idea

■ Don't Understand 30.00%

■ Somewhat Understand 10.00%

■ Understand 20.00%

■ Understand Very Well 40.00%
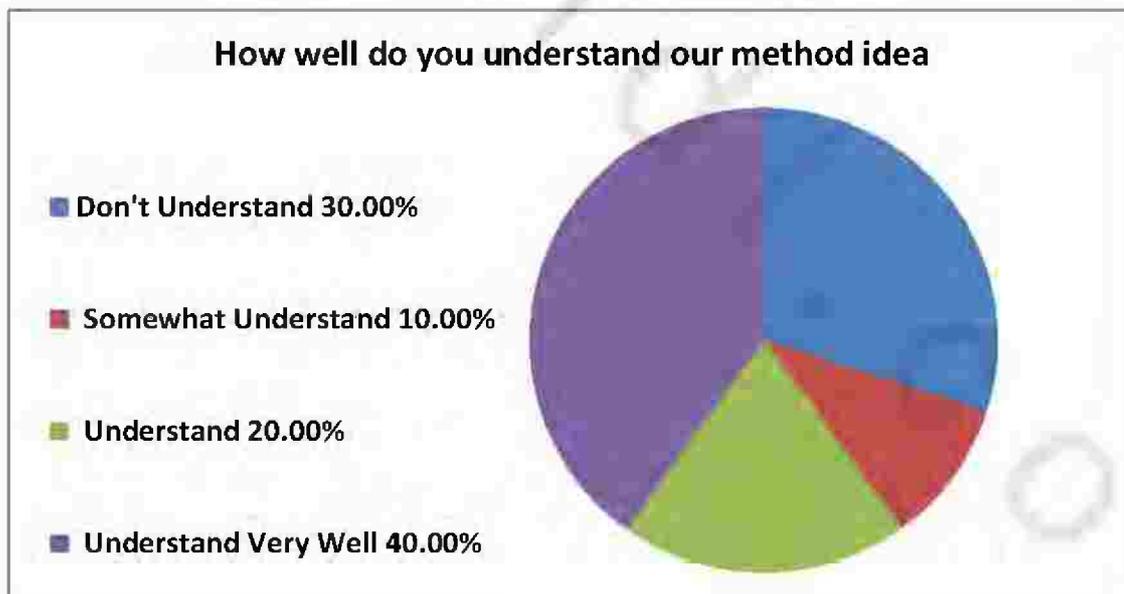
4. **What is your overall interest in the method?** 24% Not interested, 30% Somewhat interested, 40% Interested, 6% Very interested, most of people who had background

about remote sensing were interested to hear more about this topic and asked for presentation.
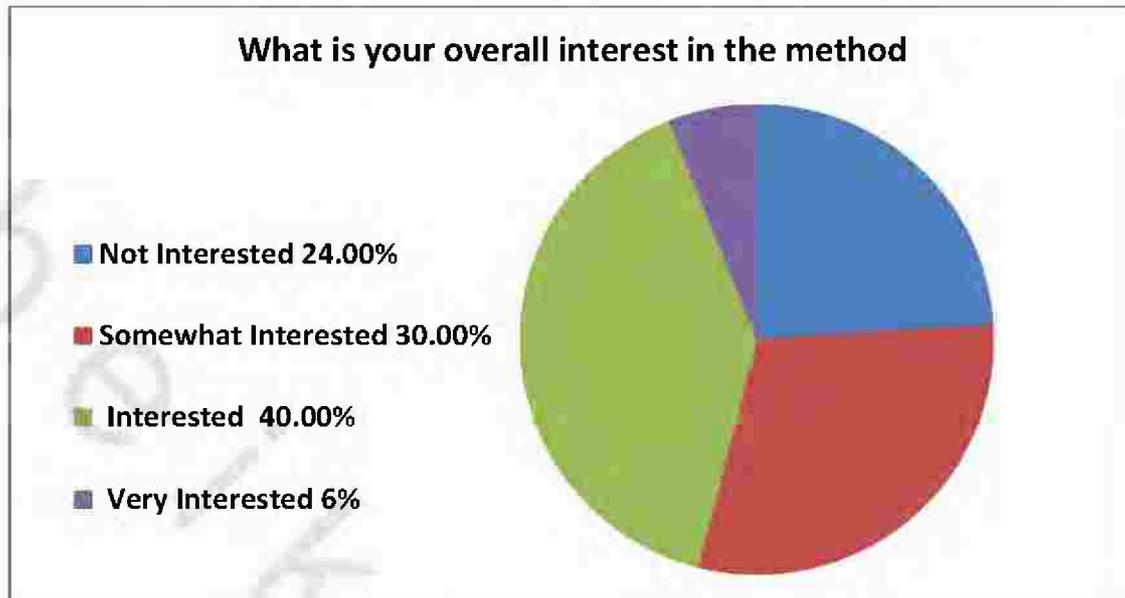
5. Have you ever used a method such as the one proposed. 40% yes, 60% No, this indicates that this method is not commonly used in Egypt despite of being very economic in reconnaissance stage.
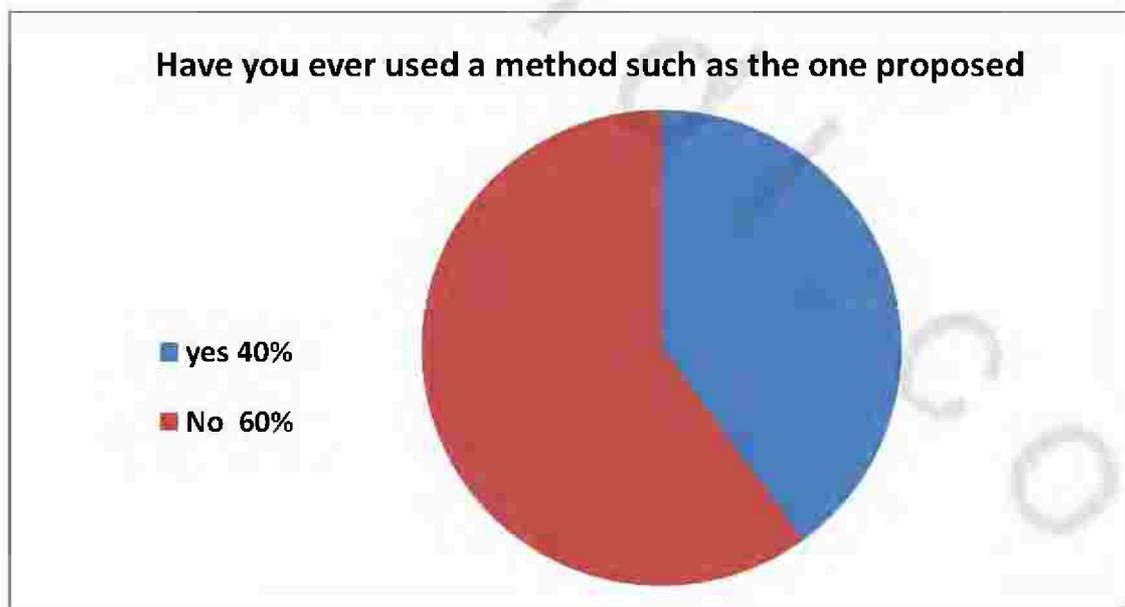
6. Please tell us a briefly about your experience in trying the method that was similar to what we are proposing:

Most people have not answered this question because it belongs to the experience about using satellite images for oil exploration but some was as follows:

7. What did you like the most? The most liked that satellites provide information about the surface and this method is cost effective but information about underground phenomena from surface is always poor.

8. What was the main reason for using this method? The main reason was that seismic study for an area of interest was not available and geological data was not completed about underground maps.

9. How much did you pay for this method? Most of people have not provided information about any financesbut the answer was about 20000$.

10. Assuming that we have a tool that uses remote sensing for oil exploration, what would be the chance of using such a tool with your respective firm? 26.6% Definitely, 20% Probably, 33.3% Not Sure, 14% Probably Not, 6% Definitely Not.

Most of people have agreed that they may use the system and try it with or without the current system under the condition that they get results in less time, less others decides not to try new system and preferred to stay with their current system and they are satisfied with it.

Assuming that we have a tool that uses remote sensing for oil exploration, what would be the chance of using such a tool with your respective firm

- Definitely 26.60%
- Probably 20%
- Not Sure 33.40%
- Probably Not 14%
- Definitely Not 6.00%
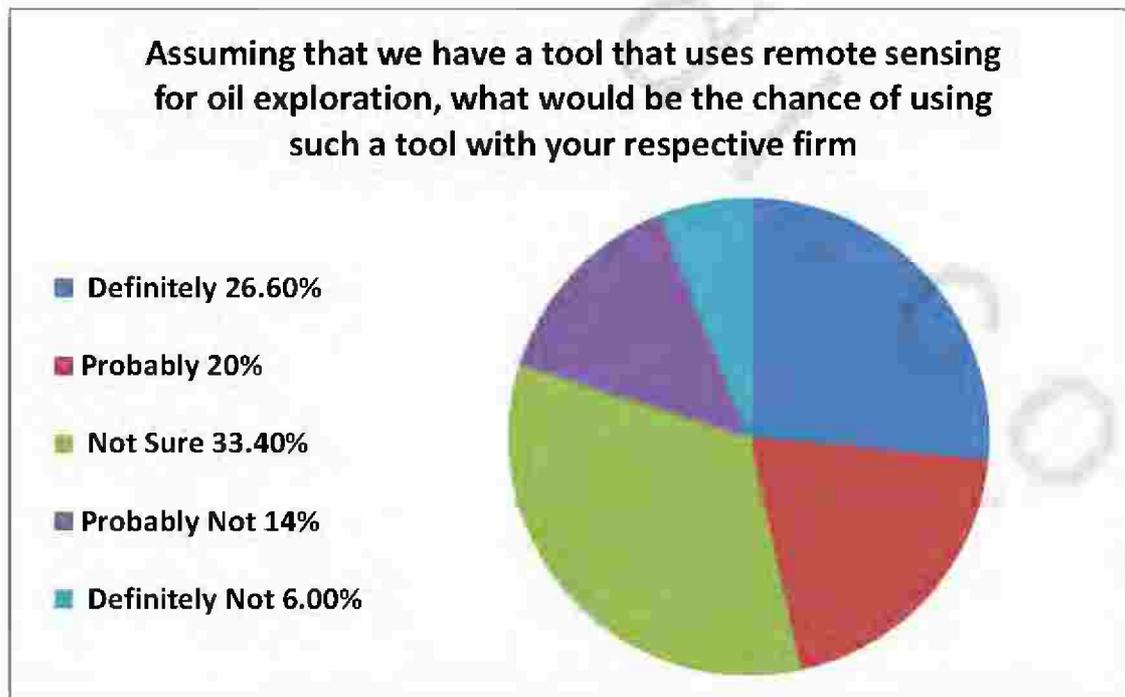
11. Please explain difficulties and disadvantages of your system of exploration?
Some of people answered this question that they have no problem about their current system , others suffered from high cost and low probability and finally most of them are agreed that current system of exploration are taking too long time to get results.

How often do you believe you would use this Method? 16.6 % Never, 20% Rarely, 30% Sometimes, 16.6% Often, 16.6% Always, these ratios indicates that the probability of using such a system in oil and gas companies are accepted, especially for exploration companies and a part of people that refused the system are other petrochemical and pipeline companies and a another part that have not understood the description very well, I think this is promising.

How often do you believe you would use this Method

- Never 16.60%
- Rarely 20%
- Sometimes 30%
- Often 16.60%
- Always 16.80%
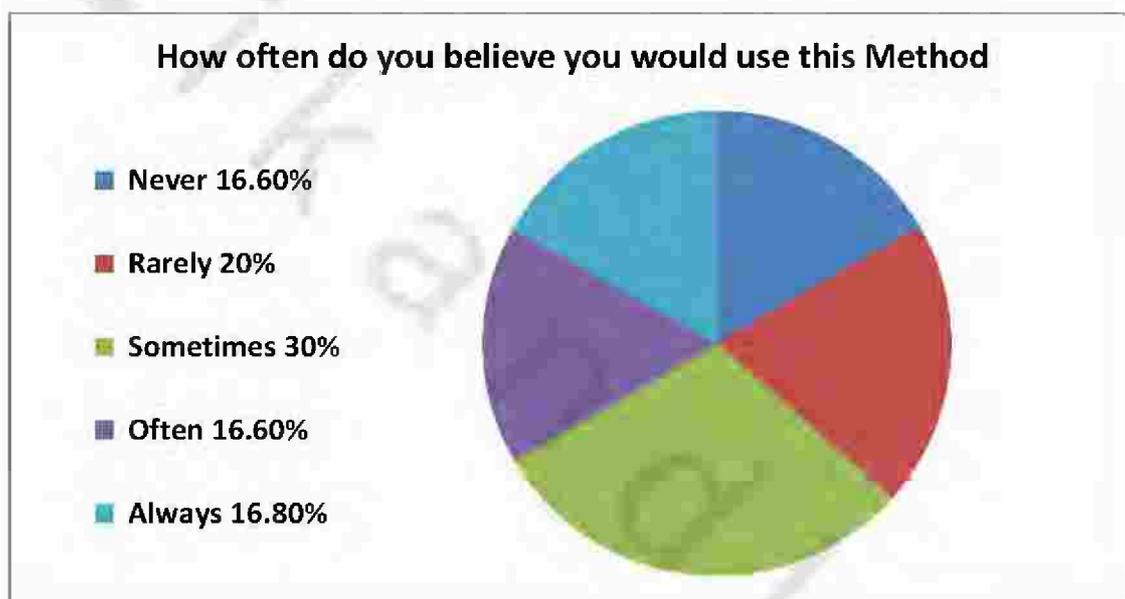
13. How long do you believe such a Method could be useful to you? 3.3%less than a month, 23.7 %1-6month, 10% 1-3years, 30% Over 3 years, 33% wouldn't be useful, People in oil and gas industry have not provided accurate answers about time because they have not scheduled for this issue, but some preferred to give answers on the long term and have not promised to apply the system soon.

How long do you believe such a Method could be useful to you

- less than a month 3.30%
- 1-6 month 23.70%
- 1-3 years 10%
- Over 3 years 30%
- wouldn't be useful 33%
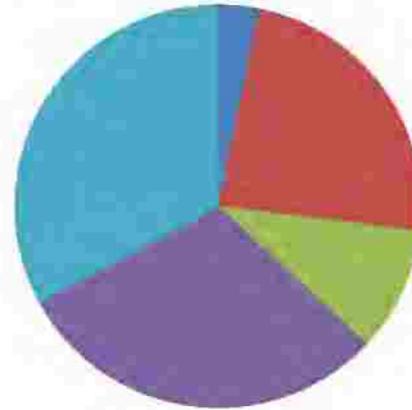
14. Where did you hear about a similar system previously? 20% On a website, 3% On a blog, 20% In a magazine, 0% In a trade-show, 20% On TV, 0% On the Radio, 0% On a billboard, 0% In a store, 21% Via a colleague/friend, 10% Via email, 3% Via flyer , 3% Industry Publication, some people heard about the system from more than one source and this was very promising that they have a little background about similar projects.

Where did you hear about a similar system previously

- On a website 20%
- On a blog 3%
- In a magazine 20%
- n a trade-show 0%
- On TV 20%
- On the Radio 0%
- On a billboard 0%
- In a store 0%
- Via a colleague/friend 21%
- Via email 10%
- Via flyer 3%
- Industry Publication 3%
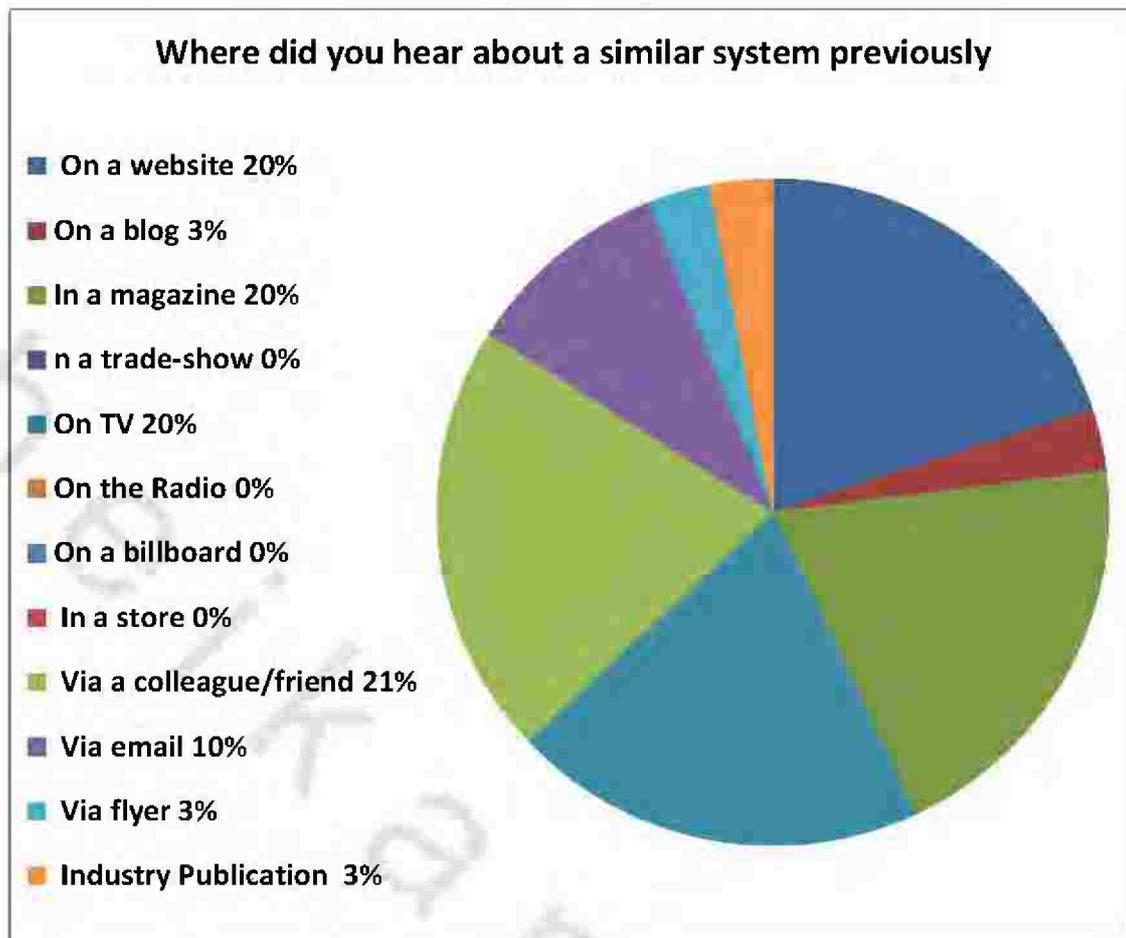
4.3.3 Summary:

actually many of people was very interested to hear more about that, some was very interested to know about the cost of using satellite images for oil exploration to be compared with their current system and that was a very important parameter for them to decide if they are ready or intend to try such system. Others were pessimistic and decided not to hear about that topic despite of having strong background about it , they was very satisfied with current system and gave feedback that satellites are very poor for subsurface information and it was very difficult to tell what is underground form surface indicators, so they recommended to integrate between surface and subsurface study as a complete solution for oil exploration and asked to work as a team with geological and geophysical staff in exploration departments in different companies.

Most of people who heard about similar topic commonly was in Europe and USA and not in Arab countries except Yemen. This means that will be a good opportunity to start this research in Egypt and expanding to other countries.