

## Resources and Its Effect on Increasing the Demand of Geotourism Sites: A Case Study of Petrified Forest Protectorate

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### Abstract

This paper aims to identify the role of resources (created and endowed) on increasing the demand of geotourism sites in Egypt, in particular, Petrified Forest Protectorate. A single case study was applied in this research to reach the research objectives. This research is based on a quantitative approach to obtain adequate information for achieving the research aim, the questionnaire was used for data collections. A convenience sample technique was chosen in this research. The total number of distributed questionnaires was 250 copies. The final returned questionnaires were 190 copies with 76% response rate. Statistical Package for Social Sciences (SPSS, version 25) program was used for analysing data. The results revealed that there no demand for visiting Petrified Forest Protectorate. Also, it has attractions such as fossilized trees that help it to consider as a geotourism site. The results indicated that Petrified Forest Protectorate is characterized by unique diversity of geological and geomorphological features, Petrified Forest Protectorate has an interest to scientists and researchers, and it has an aesthetic value that may attract tourists.

The results found the transportation facilities and accessibility into the Petrified Forest Protectorate is an essay, but it is due to private transportation. It showed that there is no pamphlet and brochures provided to the visitors and there is no recreational activity in the Petrified Forest Area. The results showed that there is no medical service or ambulance point within or near the Petrified Forest Protectorate. This research has a number of limitations were, firstly, this research focused on one case study of Petrified Forest Protectorate. Secondly, the literature showed there had been a clear lack of prior research studies on geotourism site in Egypt. Future research should address more geosites in Egypt to identify the resources of geotourism in these sites.

**Keywords:** Geotourism, Geosite, Geotourism Attraction, Resources, Petrified Forest Protectorate

### Introduction

Today, the requirements of tourists are still increasing, and there are still new challenges in this field (Allan, 2011). Berdo (2016) considered the core resources and attractors are the fundamental reasons that prospective visitors choose one destination over another. However, Dwyer and Kim (2003) indicated that tourist motivations can be classified in several ways, while, core resources are a 'pull factor' for some types of tourism. Additionally, the natural resources of a destination define the framework, which the visitor enjoys the destination. It includes climate, flora and fauna, scenery and other physical assets (Dimoska and Trimcev, 2012).

Geological heritage of Egypt is special interest because of three reasons. First, the diversity of geological features known from this country and the complex nature of its geological evolution make it very promising for inventory, conservation, and tourism use. Second, geological research in Egypt has been intense for many decades, and the available information is rigorously systematized. Third, the cultural heritage of Egypt (e.g., pyramids) is well-known, and it is clear how effectively cultural heritage facilitates the promotion and tourism utility of geological heritage (Abdel-Maksoud and Hussien, 2016; Abdel-Maksou and Abdel-Maksoud, 2017).

According to Soliman and Abou-Shouk (2016) and Sallam and Ruban (2017) Egypt has several geosites that reflect its geological history. But, unfortunately, some Protectorates are not

currently monitored as a geoheritage place or even not recorded as a protected area (Abdel-Maksou and Abdel-Maksoud, 2017). As well, Sallam et al. (2018b) reported that the Protectorates in Egypt and the existing tourism programs do not offer geoconservation and geotourism activities. Therefore, the aim of this paper is to identify the role of resources (created and endowed) in increasing demand on geotourism sites in Egypt in particular Petrified Forest Protectorate.

## **Literature Review**

### **Geotourism Resources**

Ritchie and Crouch (2003) divided resources in to two types: (1) core resources and attractors which including physiography, culture and history, market ties, mix of activities, special events, and tourism superstructure; (2) supporting factors and resources such as infrastructure, accessibility, facilitating resources, and enterprise). Whereas the core resources and attractors of a destination constitute the primary motivations for inbound tourism, supporting factors and resources exert more of a secondary effect by providing a foundation upon which a successful tourism industry can be established. As well, Dwyer and Kim (2003), classify the Resources category into: firstly, endowed (inherited) that can be classified as Natural (mountains, lakes, beaches, rivers, climate etc.) and Heritage or Cultural (cuisine, handicrafts, language, customs, belief systems etc.) and secondly, created resources which include tourism infrastructure, special events, the range of available activities, entertainment and shopping.

Berdo (2016) reported that the core resources are the fundamental reasons that prospective visitors choose one destination over another. The mere existence of such resources is insufficient to generate visitation to a site in the absence of tourism infrastructure (accommodation, transportation, restaurants), organized activities, entertainment, shopping and so on which enable or facilitate visitation. Such attributes represent 'value added' by organizations in the destination to the overall tourism product. In the term of Egypt, it has an advanced position (22nd, up 19 places) in terms of cultural resources and business travel due to the high number of searches for cultural and recreational activities in Egypt. At the same time, an increased digital presence has led to a growth in digital demand for the country's popular cultural resources (8th). While, Egypt ranks (97th) in natural resources and the natural tourism digital demand ranks (46th), as for the natural resources Egypt is falling behind because of the severe decline in the attractiveness of the Egyptian natural sites and the limited number of natural reserves and protected Protectorates for the entire land Protectorate (ENCC, 2017). This leads to these hypotheses which are:

H1: There are statistically significant effects of created resources on increase the demand of Petrified Forest Protectorate.

H2: There are statistically significant effects of endowed resources on increase the demand of Petrified Forest Protectorate.

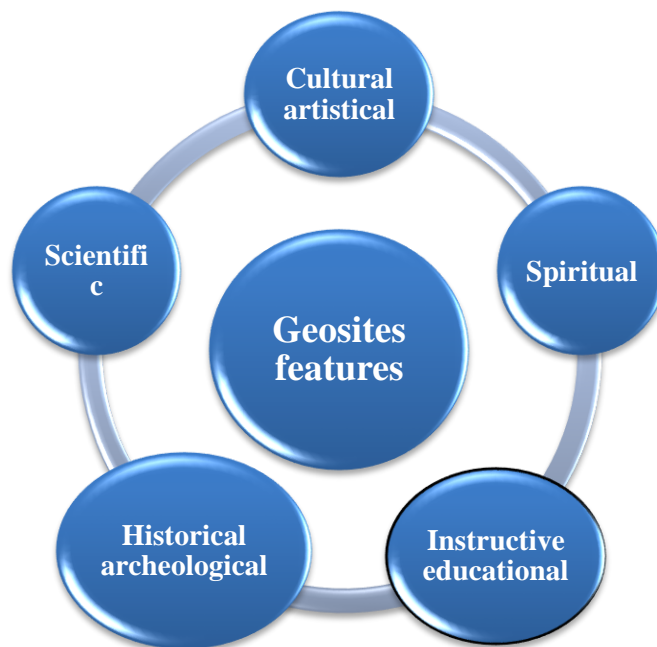
### **Geotourism Sites**

According to Premangshu and Rahul (2018) geotourism can be defined as a special for of tourism that centering on geosite. Furthermore, geoscience sites considered as portions of the geosphere which present particular importance for the comprehension of the Earth's history (Zorina and Silantiev, 2014). According to Ruban (2017) geotourism sites can be divided in to two types: geosite and geomorphosites. Meanwhile, the study of Pralong (2005), Reynard et al. (2007) and Grecu (2017) emphasized that geomorphosites are one of the multiple forms of geosites which refer to fields of geosciences (structural, paleontological, sedimentological, stratigraphical, mineralogical, geochemical, petrographical, hydrogeological, speleological,

pedological, geomorphological sites, etc.) that allows the observation of current Earth dynamics processes.

According to Zorina and Silantiev (2014), Serrano and Ruiz-Flaño (2018) geosites defined as geological objects that present a particular interest for the comprehension of the Earth, climate and life history. It allows the analysis of the spatial and temporal evolution of a Protectorate and for the meaning of surface processes and the importance of rocks in the development of specific landscapes to be comprehended. Their evaluation should be based on criteria characterizing their scientific quality (rarity, exemplarity for the Earth sciences, etc.). Several scholars highlighted that geosites have fifth features (Ilies and Josan, 2009; Theodosiou, 2010 and Kubalíková and Kirchner, 2016) (see Figure 1).

Figure 1: The geosites features



(Source: the researcher's own design)

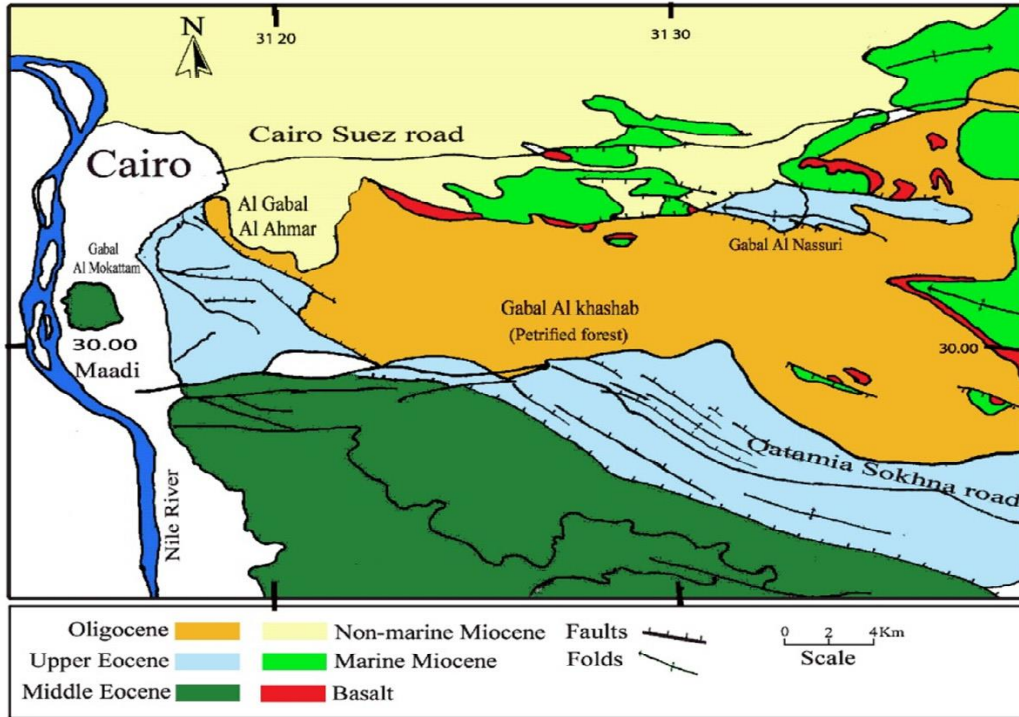
Geosites are considered as heritage sites that must be conserved for the future generations, it also considered as other natural and human heritage places. The geosites is an evidence of climate changes, tectonic evolution and the related changes in the history of life at the surface of the Earth (Sallam et al., 2018a). It allows the reconstruction of ancient processes, and of past climates, environments and geographies. Also, it is important to observe the recent period and current processes and geological features (Reynard, 2008). However, there are list of the global geosite around the world like in (Russia, Canada, USA and Germany etc.), but unfortunately there is no registered site in Egypt.

### **The Petrified Forest Protectorate as Geotourism Site**

The Petrified Forest protectorate is located about 30 km away from Cairo near Maadi. It is at least 35 million years old and was declared to be a protectorate in 1989 (EEAA, 2019) (see Figure 2). Its geological history makes it very important. The natural treasure present at the place

has given it a strong reputation as a cultural, touristic and scientific destination. There are a large variety of stones, sands, petrified trees, and trunks present in it which can help in finding out more about the ancient geological period of the earth (Abdel-Ati and Abdel-Rahman, 1998).

Figure 2: Map of Petrified Forest Protectorate in Maadi



(Source: Araffa et al., 2017:146)

The Petrified Forest is a relatively small geological protectorate compared to others in Egypt and covers a land Protectorate of only 7 square kilometers. The reserve is an ideal example of the physical history of earth. The seven-km Protectorate is covered with the remains of trees from the ancient era which were brought here due to the floods on the Red Sea hills. The period during which such floods occurred was referred to as the Oligocene (Dabes, 2006). The fossilized forest is likely to have originated through the waters of the River Nile in the ancient geological times, and then put it in this place and then it became fossilized so that the fossilized wood became a kind of fossils (Sallam et al., 2015).

### Demand of geotourism sites

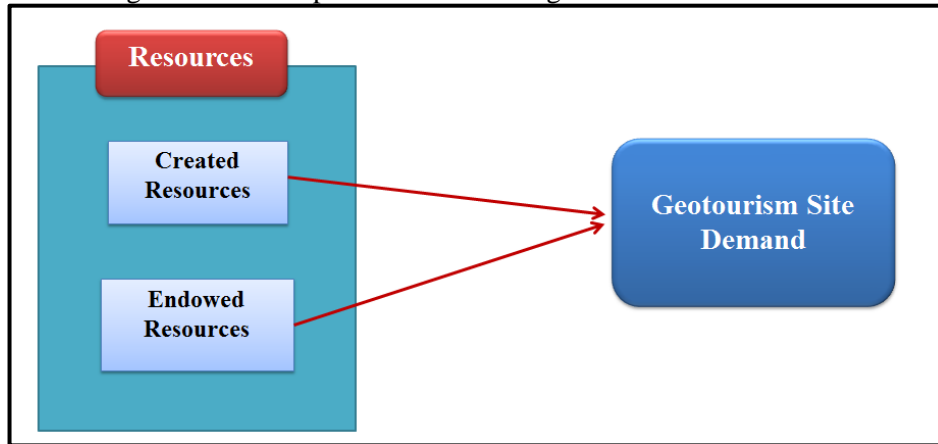
According to the digital demand for natural resources and the decline in Egypt's natural resources, despite the existence of many natural elements, as well as the increasing demand for cultural resources (ECES, 2017). Despite the interest of officials in the pattern of ecotourism as one of the types of natural tourism, but they did not give enough attention to the geotourism as one of the types of natural tourism. However, the interesting of all countries in the world for this type of tourism and they try to add these sites to UNESCO, and thus promoting the international level, so this letter seeks to know geotourism and its components and increased demand for natural resources sites and thus enhance the competitiveness of Egypt (ENCC, 2017).

### A conceptual framework of Geotourism Sites Resources

This section constructs a conceptual framework, which explains the resources of geotourism sites and its effect on increasing the demand of geotourism sites in Egypt, in particular, Petrified

Forest Protectorate. This conceptual framework is proposed to identify the study variables (see Figure 3). It showed the arrow from created resources to geotourism sites demand indicated that the mere existence of such resources is insufficient to generate visitation to a site in the absence of tourism infrastructure, which enables or facilitates visitation. As well, there is an arrow from endowed resources to geotourism sites demand it explains the influence of the nature of demand conditions on the geosite developed, it also showed the important of endowed resources in increase demand of geotourism sites, as well, these resources can be classified as natural features, mountains, lakes, beaches, rivers, and climate and physical assets.

Figure 3: A conceptual framework of geotourism sites resources



## Methods

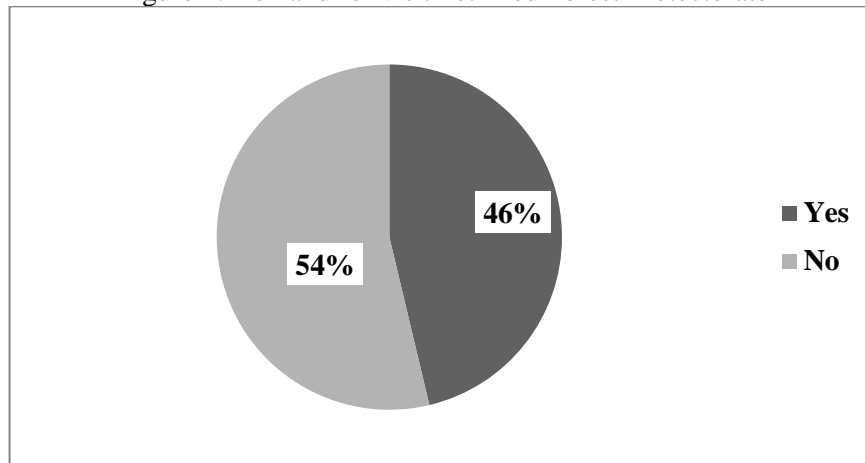
The case study research approach represents a proper methodology to answer the research questions (Yin, 2009). A single case study was used to achieve the research aim, and research question. A quantitative research method was used to deeply identify and understand the research problem which will lead to better reflection on the research aim (Johnson et al., 2010). Questionnaire was used for data collection methods. Questionnaire was broken into six sections including; Personal features, demand on Petrified Forest protectorate, the attraction of Petrified Forest protectorate, created resources, endowed resources and increase demand on geotourism site. A convenience sampling technique is applicable to both qualitative and quantitative studies (Etikan et al., 2016). So, Sampling adopted in the current research is a convenience sampling which including; experts (which have experience and knowledge in geotourism sites) and official staff (General Authority for Tourism Development and Egyptian Tourist Authority in Ministry of Tourism, Egyptian Environmental Affair Agency and Mangers of Petrified Forest Protectorate. The total number of distributed questionnaires was 250 copies. The final returned questionnaires were 190 copies with 76% response rate.

## Result and Discussion

### Geotourism demand at Petrified Forest Protectorate

The respondents were asked is there demand for visiting Petrified Forest Protectorate? The participants were answering depending on their view, 101 (54%) of the respondents were said no, 87 (46%) of the respondents were said yes (see Figure 4). Similarity with, Camilleri (2018) mentioned that the demand for tourism products may be affected by the marketing mix elements. Therefore, this reserve suffers from a lack of marketing and publicity.

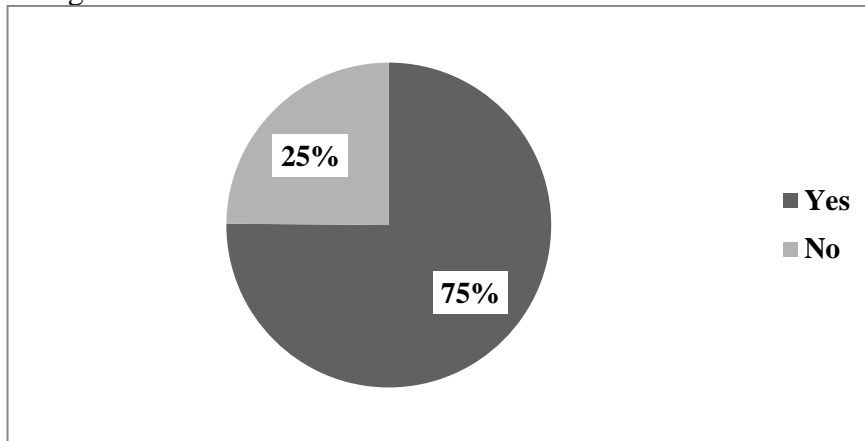
Figure 4: Demand for visit Petrified Forest Protectorate



### Geotourism attraction at Petrified Forest Protectorate

As noted in the literature review, Ilies and Josan (2009); Theodosiou (2010); Kubalíková (2013); and Kubalíková and Kirchner (2016) geosites have fifth features (scientific, cultural- artistic, historical, instructive-educational). The respondents were asked, does Petrified Forest Protectorate have an attraction to be considered a geotourism site? 142 (75%) of the respondents were answer yes. While 47(25%) of the participants were answer no (see Figure 5).

Figure 5: Geotourism attraction at Petrified Forest Protectorate



### Created resources in Petrified Forest Protectorate

According to Crouch and Ritchie (1999), Dwyer and Kim (2003), the created resources including; transportations, Pamphlet, recreational activities, places to sell souvenirs, medical services, communication network, food and beverage and festivals and special events. This sub-component of the created resources is essential for success and profitability of geotourism site (see Table 1). All these sub-components will be discussed as below;

#### Infrastructure and Accessibility

The literature review reported that infrastructure play an important role in site management. However, the geoheritage and geosites have confronted many challenges, such as the accessibility and infrastructure issues, and the lack of sustainability of geoheritage (Errami et al., 2015). The results indicated that 96 (50.5%) of the respondents were agreed with the availability of transportations for visitors in Petrified Forest Protectorate (Figure 6).

Figure 5: Road to the Petrified Forest Protectorate



(Source: the researcher's own photo taking during the observation process)

### **Pamphlet and brochures**

Comprehensive information about the site should be provided to tourists before their visit by way of websites, in brochures or information at visitor center. During their visit they seek accurate, quality information in road signage, exhibit boards, maps and by tour guides (Hose, 2012). The results showed that 94 (49.5%) of the respondents were disagreed with Pamphlet, brochures and maps are available to visitors in different languages.

### **Recreational activities**

In terms of the recreational activities, the participants reported that 90 (47.4%) of the respondent indicated their disagreed with recreational activities such as camping are available in Petrified Forest Protectorate. This matched with the literature review that the entertainment industry can be a major supplier to the tourism sector. It is playing a major role in marketing sites and competitive strategy (Dwyer and Kim, 2003).

### **Shops in geotourism site**

The study of Mulec and Wise (2012) revealed that geotourism sites should have shops or outlets to promote its products to the visitors through making of local handicrafts such as the production of fossil casts and souvenirs by local enterprises. It is interesting to note that, the results revealed that 143 (75.2%) of the respondents were disagreed with there are places to sell souvenirs in Petrified Forest.

### **Medical services**

According to Leung et al. (2018) reported that healthcare must be found inside the protected Protectorate to serve the visitor. The results indicated that 91 (53.1%) of the respondents were disagreed with medical services near Petrified Forest Protectorate respectively.

### **Communication network**

A developed and well-maintained of communication provides a solid basis for the effective and efficient tourism industry (Leung et al., 2018). The results reported that half 85(44.7%) of the respondents were agreed and disagreed that there is a communication network within Petrified Forest Protectorate.

### Hospitality in Petrified Forest Protectorate

According to Leung et al. (2018) visitors spend considerable money in protected Protectorates or in activities associated with them through entrance fees, accommodations, activities and when they buy food and drink and crafts, this money can be accrued by different actors. The results revealed that a little more than half 103 (54.5%) and of the respondents were disagreed with the availability food and beverage service.

### Festivals and special events

According to the literature review special events can create high levels of interest and involvement on the part of both visitors and residents. Some places have pursued the development of special events as a cornerstone of their competitive strategy (Crouch, 2007). 125 (66.2%) of the respondents were disagreed that there are festivals and special events are carried out Petrified Forest Protectorate.

Table 1: The results of created resources in Petrified Forest Protectorate

| Created resources in Petrified Forest Protectorate                                       |       | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|--|-------|-------------------|----------|---------|-------|----------------|
| 1. Transportations are available for visitors in Petrified Forest Protectorate.          | Freq. | 24                | 45       | 25      | 59    | 37             |
|  | %     | 12.6              | 23.7     | 13.2    | 31.1  | 19.5           |
| 2. Pamphlet, brochures and maps are available to visitors in different languages.        | Freq. | 29                | 65       | 33      | 39    | 24             |
|  | %     | 15.3              | 34.2     | 17.4    | 20.5  | 12.6           |
| 3. There are recreational activities in Petrified Forest Protectorate such as camping.   | Freq. | 23                | 67       | 29      | 49    | 22             |
|  | %     | 12.1              | 35.3     | 15.3    | 25.8  | 11.6           |
| 4. There are places to sell souvenirs in Petrified Forest Protectorate.                  | Freq. | 47                | 96       | 30      | 9     | 8              |
|  | %     | 24.7              | 50.5     | 15.8    | 4.7   | 4.2            |
| 5. There are medical services within or near Petrified Forest Protectorate.              | Freq. | 25                | 66       | 40      | 34    | 15             |
|  | %     | 18.4              | 34.7     | 21.1    | 17.9  | 7.9            |
| 6. There is a communication network within Petrified Forest Protectorate.                | Freq. | 30                | 55       | 20      | 62    | 23             |
|  | %     | 15.8              | 28.9     | 10.5    | 32.6  | 12.1           |
| 7. There is food and beverage service within or near Petrified Forest Protectorate.      | Freq. | 29                | 74       | 28      | 43    | 15             |
|  | %     | 15.3              | 39.2     | 14.8    | 22.8  | 7.8            |
| 8. There are festivals and special events are carried out Petrified Forest Protectorate. | Freq. | 43                | 82       | 23      | 27    | 14             |
|  | %     | 22.8              | 43.4     | 12.2    | 14.3  | 7.4            |

Results in the following table (2) showed that, the mean scores for created resources in Petrified Forest Protectorate range from 1.69 to 3.11. The standard deviations for the responses to the items measuring it ranged between 0.56 to 1.34, which displays a reasonable level of variability. The results reported that the grand mean of the created resources in Petrified Forest Protectorate were 2.38, comparing that mean with the 5-point of Likert scale strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5), this means is situated between the choice number (2) disagree and (3) neutral and it closed by the choice number (2). These means showed the disagreement of the participants for the created resources in Petrified Forest Protectorate.



Table 2: Mean and Standard Deviation of created resources in Petrified Forest Protectorate

| Created resources in Petrified Forest Pprotectorate                                      | Mean | Std. Deviation | Number of responses (n=190) |
|--|------|----------------|-----------------------------|
| 1. Transportations are available for visitors in Petrified Forest Protectorate.          | 3.11 | 1.34           | 190                         |
| 2. Pamphlet, brochures and maps are available to visitors in different languages.        | 2.65 | 1.07           | 190                         |
| 3. There are recreational activities in Petrified Forest Area such as camping.           | 1.69 | 0.56           | 190                         |
| 4. There are places to sell souvenirs in Petrified Forest Protectorate.                  | 1.88 | 0.75           | 190                         |
| 5. There are medical services within or near Petrified Forest Protectorate.              | 2.52 | 1.05           | 190                         |
| 6. There is a communication network within Petrified Forest Protectorate.                | 2.66 | 1.09           | 190                         |
| 7. There is food and beverage service within or near Petrified Forest Protectorate.      | 2.58 | 1.06           | 190                         |
| 8. There are festivals and special events are carried out Petrified Forest Protectorate. | 1.99 | 0.79           | 190                         |
| Statistics for all Variables   | 2.38 | 0.96           | 190                         |

For testing the first hypothesis: there are statistically significant effects of created resources on increase the demand of Petrified Forest Protectorate. The researcher was used Linear Regression Analysis for measuring the effect of created resources on increase the demand of geotourism sites Petrified Forest Protectorate in Egypt see Table 3.

Table 3: Results of Linear Regression Analysis of Created Resources

| Model Summary |                    |          |                   |                            |
|---------------|--------------------|----------|-------------------|----------------------------|
| Model         | R                  | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1             | 0.348 <sup>a</sup> | 0.661    | 0.105             | 0.43326                    |

a. Predictors: (Constant), Special events, Communications, Transportation , Medical facilities , Souvenirs shop, Food &beverage, Brochure, Recreational activities

The previous table of interest is the Model Summary table. This table provides the R, R<sup>2</sup>, adjusted R<sup>2</sup>, and the standard error of the estimate, which can be used to determine how well a regression model fits the data. The value of the determination coefficient (R<sup>2</sup>) was (0.661) for created resources in Petrified Forest Protectorate. The percentages of the determination coefficient (R<sup>2</sup>) were (66%) in Petrified Forest Protectorate. This means that there is a strong impact of the independent variable (created resources) on the dependent variable, which indicates that of the changes that occur in the dependent variable increase demand of geotourism site are due to the changes that occur within the independent variable.

| ANOVA <sup>b</sup> |            |                |     |             |       |                    |
|--------------------|------------|----------------|-----|-------------|-------|--------------------|
|                    | Model      | Sum of Squares | df  | Mean Square | F     | Sig.               |
| 1                  | Regression | 4.647          | 3   | 1.549       | 8.252 | 0.000 <sup>a</sup> |
|                    | Residual   | 33.788         | 181 | 0.188       |       |                    |
|                    | Total      | 38.435         | 184 |             |       |                    |

|   |  |
|---|--|
| a. Predictors: (Constant), Special events, Communications, Transportation, Medical facilities, Souvenirs shop, Food & beverage, Brochure, Recreational activities |  |
| b. Dependent Variable: Enhance demand of Petrified Forest Protectorate  |  |

The previous table showed the Variance Analysis, the results reported that the calculated (F) value was (8.252) and degrees of freedom (3.181). The results indicated that the level of (F) at (0.000) level is less than (0.05), this showed that a significant effect of the independent variables on the dependent variable in the Petrified Forest Protectorate.

Additionally, in view of the regression determination in the following table, it was found that the constant coefficient B = 1.051, Sig. = 0.001 for transportation, B = 0.036, Sig. = 0.002 for brochures, B = 1.029, Sig. = 0.001 for recreational activities, B = 3.008, Sig. = 0.003 for souvenir shops, B = 2.026, Sig. = 0.004 for medical facilities, B = 1.017, Sig. = 0.000 for communications, B = 0.023, Sig. = 0.005 for food and beverage, B = 2.057, Sig. = 0.001 for special event. This means there is a direct effect of independent variables on the dependent variable. On the other hand, for test the significant of the regression coefficients, (T) value of the independent variable of created resources was ranged from T = 3.216 to T = 1.058, Sig. = 0.000 to Sig. = 0.005 at a significant level less than (0.05). Therefore, there was effect of created resources on increase the demand of geotourism site in Petrified Forest Protectorate.

|       |                         | Coefficients <sup>a</sup>   |            |                           |       |       |
|-------|-------------------------|-----------------------------|------------|---------------------------|-------|-------|
| Model |                         | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig.  |
|       |                         | B                           | Std. Error | Beta                      |       |       |
| 1     | (Constant)              | 1.402                       | 0.202      |                           | 6.932 | 0.000 |
|       | Transportation          | 1.051                       | 0.025      | 0.150                     | 2.059 | 0.001 |
|       | Brochure                | 0.036                       | 0.027      | 0.101                     | 1.341 | 0.002 |
|       | Recreational activities | 1.029                       | 0.028      | 0.080                     | 1.058 | 0.001 |
|       | Souvenirs shop          | 3.008                       | 0.036      | 0.016                     | 3.216 | 0.003 |
|       | Medical facilities      | 2.026                       | 0.028      | 0.069                     | 2.926 | 0.004 |
|       | Communications          | 1.017                       | 0.026      | 0.050                     | 1.679 | 0.000 |
|       | Food & beverage         | 0.023                       | 0.028      | 0.062                     | 1.834 | 0.005 |
|       | Special events          | 2.057                       | 0.029      | 0.149                     | 1.962 | 0.001 |

a. Dependent Variable: Enhance demand of Petrified Forest Protectorate

Therefore, the results revealed that there are statistically significant effects of created resources on increase the demand of Petrified Forest Protectorate. The study refused the null hypothesis and accepted the alternative one, which declared that there are significant effects of created resources on increase the demand of Petrified Forest Protectorate.

### Endowed resources in Petrified Forest Protectorate

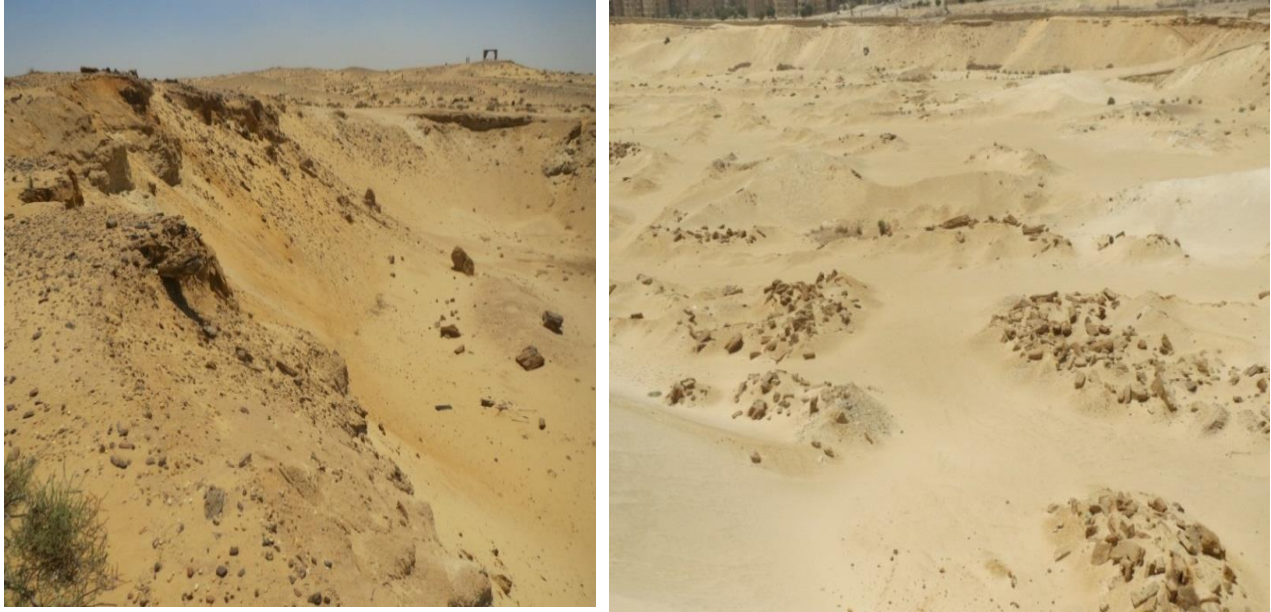
Endowed resources refer to natural attraction (Dwyer and Kim, 2003). These attractions play a critical role in increase the demand and constitute the primary motivation to travel for tourist, which lead to enhance tourism competitiveness and sustainability (Crouch, 2007). These factors will be discussed as below;

### Diversity of geological and geomorphological forms

As mentioned by Dowling (2011) geosites involves the geological and geomorphic features which contribute in the formation of the sense of place for any geosite).As well as, geosites differ by their unique geological features, which determine their value for science, education, and tourism (Zorina and Silantiev, 2014). The result claimed (83.8%) of the respondents were

agreeing that Petrified Forest Protectorate is characterized by unique diversity in geological and geomorphological aspects see Figure 7 and 8.

Figure 7: Diversity of geological forms in Petrified Forest Protectorate



(Source: the researcher's own photo taking during the observation process)

### **Geological heritage**

Štrba et al. (2016) explained that the geosite representing the geological heritage of the Earth. The study of Gatley and Parkes, (2018) mentioned that key characteristics of selected geosites have good potential for increasing the awareness of geological heritage. The result showed that (87.4%) of the respondents were agreed that Petrified Forest Protectorate has a unique geological heritage (see Figure 7).

### **Research and educational value**

Research and educational value is related to the understanding of the origin of life and landforms, evolution of the landscape and climate and palaeogeographic reconstructions (Gray, 2004; Tenk, 2015). Similarity with, result of the current research that (85.8%) of the respondents were agreed that the Protectorate of Petrified Forest Protectorate has an interest to scientists and researchers (see Figure 7).

### **Aesthetic value**

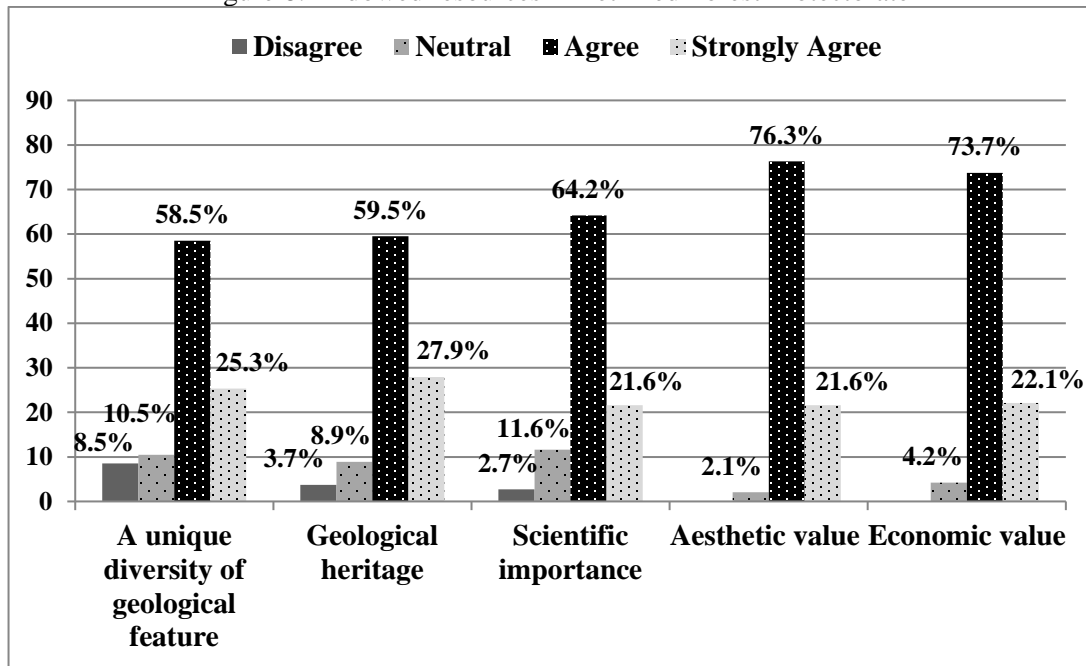
The aesthetic value of geodiversity is a very important issue for geotouristic activities (Ruban, 2015). As well as, Premangshu and Rahul (2018) reported that the geosites has many values including aesthetic value. The results showed that (97.9%) of the respondents were agreed that the Protectorate of Petrified Forest Protectorate has an aesthetic value that attract tourists (see Figure 8).

### **Economic value**

Premangshu and Rahul (2018) reported that the geosites has many values such as; economic values. As well, the geosite play an important role in economic asset as a geotouristic product and provide in a very significant way to poverty alleviation (Henriques, 2015). (95.8%) of the

respondents were completely agreed that the Protectorate of Petrified Forest Protectorate has economic value (see Figure 8).

Figure 8: Endowed resources in Petrified Forest Protectorate



Additionally, the results in table (4) showed that the mean scores for the natural and geological resources in Petrified Forest Protectorate range from 4.01 to 4.19. The standard deviations for the responses to the items measuring it ranged between 0.44 to 0.81 displays a reasonable level of variability. The results reported that the grand mean of the natural and geological resources variables were 4.10, comparing that mean with the 5-point of Likert scale strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5), this mean is situated between the choice number (4) agree and (5) strongly agree and it closed by the choice number (4). These mean statistics show the agreement of the participants for the natural and geological resources in Petrified Forest Protectorate.

Table 4: Mean and Standard Deviation of the endowed resources in Petrified Forest Protectorate

| Endowed resources in Petrified Forest Area  | Mean | Std. Deviation | Number of responses (n=190) |
|---|------|----------------|-----------------------------|
| 1. Petrified Forest Area is characterized by unique diversity in geological and geomorphological aspects. | 4.01 | 0.81           | 190                         |
| 2. Petrified Forest Area has a history and geological importance.   | 4.11 | 0.71           | 190                         |
| 3. Petrified Forest Area has an interest to scientists and researchers.                                   | 4.03 | 0.70           | 190                         |
| 4. Petrified Forest Area has an aesthetic value that targets tourists.                                    | 4.19 | .440           | 190                         |
| 5. Petrified Forest Area has economic value.  | 4.17 | 0.48           | 190                         |
| Statistics for all Variables  | 4.10 | 0.70           | 190                         |

For testing the second hypothesis: there are statistically significant effects of endowed resources on increase the demand of Petrified Forest Protectorate.

The results in the following table (5) of interest are the Model Summary. This table provides the R, R<sup>2</sup>, adjusted R<sup>2</sup>, and the standard error of the estimate, which can be used to determine how well a regression model fits the data. The value of the determination coefficient (R<sup>2</sup>) was (0.801) for endowed resources of Petrified Forest Protectorate. The percentages of the determination coefficient (R<sup>2</sup>) were (80) in Petrified Forest Protectorate. This means that there is a strong impact of the independent variable (endowed resources on increase the demand of geotourism sites) on the dependent variable, which indicates that of the changes that occur in the dependent variable increase the demand of geotourism site are due to the changes that occur within the independent variable.

Table 5: Results of Multiple Regression Analysis of Endowed Resources

| Model Summary |                    |          |                   |                            |
|---------------|--------------------|----------|-------------------|----------------------------|
| Model         | R                  | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1             | 0.255 <sup>a</sup> | 0.801    | 0.067             | 0.45621                    |

a. Predictors: (Constant), Economic value, A unique diversity in geological features, Geological heritage, Scientific significance, Aesthetic value

The results in the following table showed the Variance Analysis, the results reported that the calculated (F) value was (3, 177) = 5.752, Sig. = 0.012, so there was effect of endowed resources to increase the demand of Petrified Forest Protectorate.

| ANOVA <sup>b</sup> |            |                |     |             |       |                    |
|--------------------|------------|----------------|-----|-------------|-------|--------------------|
| Model              |            | Sum of Squares | df  | Mean Square | F     | Sig.               |
| 1                  | Regression | 2.250          | 3   | 1.371       | 5.752 | 0.012 <sup>a</sup> |
|                    | Residual   | 35.029         | 177 | 0.189       |       |                    |
|                    | Total      | 38.279         | 180 |             |       |                    |

a. Predictors: (Constant), Economic value, A unique diversity in geological features, Geological heritage, Scientific significance, Aesthetic value

b. Dependent Variable: Enhance demand of Petrified Forest Protectorate

| Coefficients <sup>a</sup>  |   |                             |            |                           |       |       |
|--|---|-----------------------------|------------|---------------------------|-------|-------|
| Model  |   | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig.  |
|  |   | B                           | Std. Error | Beta                      |       |       |
| 1  | (Constant)                                | 1.463                       | 0.447      |                           | 6.275 | 0.001 |
|  | A unique diversity in geological features | 1.026                       | 0.042      | 0.047                     | 3.622 | 0.005 |
|  | Geological heritage                       | 2.008                       | 0.048      | 0.013                     | 2.176 | 0.006 |
|  | Scientific significance                   | 0.064                       | 0.049      | 0.099                     | 1.293 | 0.019 |
|  | Aesthetic value                           | 1.040                       | 0.080      | 0.040                     | 2.506 | 0.010 |
|  | Economic value                            | 1.018                       | 0.073      | 0.020                     | 1.252 | 0.003 |
| a. Dependent Variable: enhance demand of Petrified Forest Protectorate |   |                             |            |                           |       |       |

The results indicated that the regression determination in the following table, it was found that the constant coefficient B = 1.026, Sig. = 0.001 for A unique diversity in geological features, B = 2.008, Sig. = 0.005 for geological heritage, B = 0.064, Sig. = 0.019 for scientific significance, B

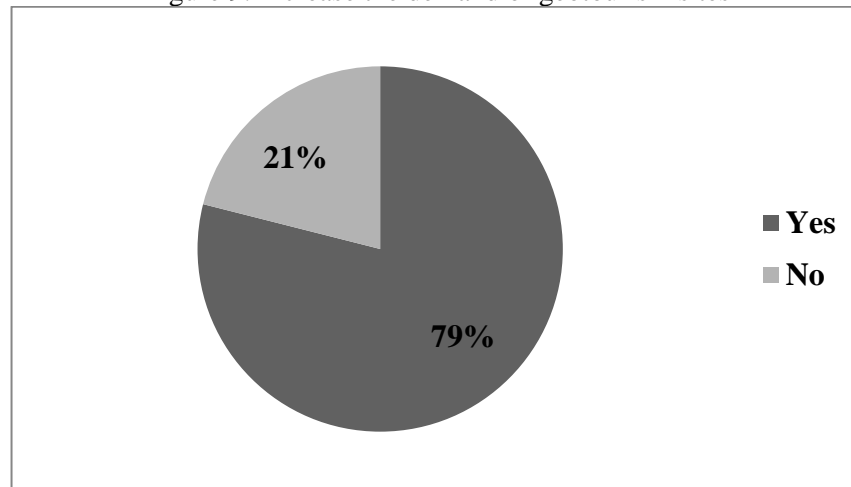
= 1.040, Sig. = 0.010 for aesthetic value, B = 1.018, Sig. = 0.003 for economic value. This means there is a direct effect of independent variables on the dependent variable. On the other hand, for test the significant of the regression coefficients, (T) value of the independent variable of endowed resources was ranged from T = 3.622 to T = 1.252, Sig. = 0.001 to Sig. = 0.019 at a significant level less than (0.05). Therefore, there was effect of endowed resources on increase the demand of Petrified Forest Protectorate.

Therefore, the results revealed that there are statistically significant effects of endowed resources on increase the demand of Petrified Forest Protectorate. The study refused the null hypothesis and accepted the alternative one, which declared that there are significant effects of endowed resources on increase the demand of Petrified Forest Protectorate.

### Increasing demand on geotourism sites

The results revealed that (79%) of the respondents were said yes that resources will increase the demand on Petrified Forest Protectorate as a geosite. While (21%) of the respondents were said no (see Figure 9). However, the literature review reported that the digital demand for natural resources and the decline in Egypt's natural resources, despite the existence of many natural elements, as well as the increasing demand for cultural resources.

Figure 9: Increase the demand of geotourism sites



### Conclusion and further research

The results showed that their attractions such as fossils, rocks, and fossilized trees, that help Petrified Forest Protectorate to be considered as a geotourism site, furthermore, there was not demand for visiting it. The results found the transportation facilities and accessibility into the Petrified Forest Protectorate is essay, but it is due to private transportation. As well as, it showed that there is no pamphlet and brochures provided to the visitors and there is no a recreational activity in the Petrified Forest Area. However, it noted that there are no shops or place for selling souvenirs to the visitors and there is a communication network in place. The results showed that there is no medical service or ambulance point within or near the Petrified Forest Protectorate.

Additionally, the results reported that the participants were completely agreed with endowed resources variables in Petrified Forest Protectorate. The results reported that Petrified Forest Area Protectorate is characterized by a diversity of natural, geological, and geomorphological features. This research has number of limitations were, firstly, this research focused on one case study of Petrified Forest Protectorate. Secondly, the literature showed there had been clear lack of prior

research studies on geotourism site in Egypt, in particularly Petrified Forest Protectorate. Future research should address more geosites in Egypt to identify the resources of geotourism in these sites.

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