Assessment of Geotourism Features in Hassana Dome Protected Area as a Geosite

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Abstract

This research aims to identify the role of natural and geological features and geosite management in increasing the demand of Hassana Dome Protected Area in Egypt. A single case study was applied in this research. A mixed approach was used to obtain adequate information for achieving the research aim, two stages were considered to be the most appropriate form of data collection instruments, multiple sources of data collections, including questionnaire and direct observation to gather a mix of quantitative and qualitative data. 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 and the program of (SPSS, version 25) was used for analysing data.

The results show that there was no demand for visiting Hassana Dome Protected Area. However, it has an attraction that helps it to be geotourism sites. The results indicated that Hassana Dome Protected Area is characterized by unique diversity in geological and geomorphological. As well, it has a history and geological importance and the interest of scientists and researchers, and it has an aesthetic value that targets tourists. The results reported that there are no suitable programs to promote tourism awareness of the importance of geotourism sites. The results showed that there is no plan for development and there is a lack of marketing activities or promotion plan for promoting Hassana Dome Protected Area. This research has a number of limitations were, firstly, this research focused on one case study of Hassana Dome Protected Area. Secondly, the literature showed there had been clear lack of prior research studies on geotourism site in Egypt, in particularly Hassana Dome Protected Area. Future research should address more geosites in Egypt, it also should undertake to test the findings of this research.

Keywords: Geotourism, geosite, geoheritage, geotourism attraction, geosite management, Egypt

Introduction

Today, the new trend in modern tourism towards untraditional forms of tourism such as geotourism may expand the current offer of destinations (Boley and Perdue, 2012). So, there are many destinations still isolated and unknown, however, it has become places need to be explored to meet the tourists' expectations (Cracolici and Nijkamp, 2009). On the other hand, the knowledge and experience of geological heritage are important in terms of future renovation (Brilha, 2016). Moreover, the current list of UNESCO geosites will be expanded through unique sites and buildings. So, it is important to combine with different specialities such as; geology and tourism science (Žáček et al., 2017).

The study of Campón-Cerro et al. (2017) contended that tourism destinations are facing a quite complex competitive environment, and this situation may get more complicated in the next years (Ayikoru, 2015). Further, the current situation has forced the destinations managers to seek out innovative strategies to achieve customer satisfaction and loyalty (Dwyer et al., 2012; Kim, 2014). Armenski et al. (2011) explained that the degree to which a country can benefit from its tourism industry depends largely on this competitive position on the international tourist market. Therefore, the destination needs to realize its real competitive position on the tourism market as well to define its weaknesses and treat it (Gomezelj and Mihalič, 2008). Ghiraldi et al. (2015) and Brilha (2016) highlighted that the world pays more attention to the protection and preservation of the landscape and promoting unique sites with a geological and

geomorphological feature. Although, there are many different definitions of geotourism introduced till now, almost all of them refer to special, geologically or geomorphologically significant places which mean geosites and geomorphosites represent a fundamental resource for geotourism (Kubalíková, 2013). Moreover, Tomić and Božić (2014) confirmed that geotourism represents a recognition process and giving a broader meaning to geosites which lead to better and more efficient conservation of geoheritage and geosites.

Egypt has a rich geological diversity not known to the public. This is due to the lack of studies and research in Egypt (Soliman and Abou-Shouk, 2016), to explore and enhance this geological diversity. Unfortunately, few sites have been declared as parts of the geological heritage of Egypt such as Wadi Al-Hitan, it is included in the list of the UNESCO World Heritage Sites (Abdou et al., 2017). Also, the study of Abdel-Maksoud and Hussien (2016) reported that there is a little of attention that given by the tourism industry and the official to the geological features, as well, the availability of tourist guides and brochures in the Egyptian geological sites are rarely found. Therefore, this paper aims to identify the role of natural and geological features and geosite management in increasing the demand of Hassana Dome Protected Area.

Literature review

The Geosites

Geosites mean valuable sites geologically (Zorina and Silantiev, 2014). It includes important geographical development stages of volcanic eruption, erosion and sedimentation in the history of the earth and geomorphological characters of volcanic and fault zones (Brocx and Semeniuk, 2015). Reynard (2005) and Kubalíková (2013) mentioned that the synonym of "geosites" is "geotopes". Further, geoscience sites that may be considered as a partions of the geosphere which present particular importance for the comprehension of the Earth's history (Zorina and Silantiev, 2014). The studies of geosites, it related to geography and geology sciences (Grecu, 2017). However, the study of Theodosiou (2010) reported that the geosites are important a geological heritage site. Additionally, the study of El Wartiti et al. (2008, 415) and Abdou et al. (2017:34), define a geosite as;

> A site or an 'area', a few square meters to several square kilometres in size, with geological and scientific significance, whose geological characteristics (mineral, structural, geomorphic and physiographic) meet one or several criteria for classifying it as outstanding (valuable, rare, vulnerable, endangered).

On the other hand, the study of Zorina and Silantiev (2014), and Serrano and Ruiz-Flaño (2018) defined geosites as geological objects that presents a particular interest for the comprehension of the Earth, climate and life history. It allows the analysis of the spatial and temporal evolution of an area and for the meaning of surface processes and the importance of rocks in the development of specific landscapes to be comprehended. However, Errami et al. (2015) considered the geosites as "each geological object, mineral site, landform, fossil, etc. that present a certain value to human perception or exploitation". Also, Bouzekraoui et al. (2018:88) defined the geosites as "remarkable sites containing rocks, geological phenomena, or specific landforms need valorisation and protection". To be very specific, geosite as a landform shows the particular aspects of relief being determined by the morphogenetic processes and the geographic sublayer (Ilieş and Josan, 2009). The geosites include macro and micro landforms available on the landscape attracting the attention due to their peculiarities and recreational uses (Premangshu and Rahul, 2018).

Štrba et al. (2016) provides another definition of geosites as sites representing the geological heritage of the Earth and defined geosites as geological or geomorphological objects that have

acquired a scientific (e.g. sediment to logical stratotypes, relict moraine representative of a glacier extension), cultural/ historical (e.g. religious or mystical value), aesthetic (e.g. some mountainous or coastal landscapes) and/or social/economic (e.g. aesthetic landscapes as tourist destinations) value due to human perception or exploitation. Premangshu and Rahul (2018) reported that if the geosites used for the geotourism purpose, it will become a geopark. As mentioned earlier, the researcher believes that the geosites are the essence of geotourism, which is the basis for geotourism.

The principal features of the geosites

Generally, geosites and geomorphosites do not have any standard size, neither minimum nor maximum size (Ruban, 2017). Larger geosites may include small erones. The size is not a discriminating criterion, nevertheless, each geosites may be delimitated (Reynard et al., 2007). In terms of the activity of geosites, Errami et al. (2015) reported that there are two types of geosites including; active geosites are important for observing processes currently active at the surface of the Earth, whereas inactive geosites testify processes or natural conditions that no longer exist. In some cases, destroyed or damaged active geosites may be artificially rebuilt (Reynard et al., 2007). Nevertheless, active processes in many cases are difficult to reactivate and their destruction is to be considered as irreversible at human scale (Hooke, 1994).

Additionally, Marty et al. (2007) reported that the majority of the geosites refer to natural processes, and other geosites are man-made or man-induced, sometimes it called synthetic geosites. Ilies and Josan (2009), Theodosiou (2010), Kubalíková (2013) and Kubalíková and Kirchner (2016) mentioned that geosites have fifth features:

1. *In the context of scientific feature*, geosites constituting the most representative results of the processes and factors which shape the surface of the Earth's crust, leading to land formation;
2. *The cultural-artistical feature*: It comes from the fact that geosites can be a source of artistic inspiration (painting, sculpture, and photographic art), material support for some works of art or natural framework for movie-making;
3. *The historical-archaeological features of the geosites*, between geosites and elements of history and archaeology (citadel, fortifications etc.);
4. *The geosites spiritual features*, many of geosites have a great spiritual significance kept in time, for centuries or even millennia;
5. *The instructive-educational feature*, the instructive-educational feature of the geosites resides in the depiction and understanding of the natural processes and mechanisms which led to their occurrence, as well as learning some behavioural norms in relation with the environment, especially in protected areas.

Geosites differ by their unique geological features, which determine their value for science, education, and tourism (Zorina and Silantiev, 2014). This matching with the study of Gatley and Parkes, (2018) mentioned that key characteristics of selected geosites are including; firstly, educational use; the geosite should be used for educational purposes and it has good potential for increasing the awareness of geological heritage. Secondly, community value; geosite should add value for local community e.g. create a new job, increase income and improve the standard of living.

Importance of geosites

Geosites are considered as heritage sites that must be conserved for future generations, it also considered as other natural and human heritage places. The geosites is evidence of climate changes, tectonic evolution and the related changes in the history of life at the surface of the Earth (Sallam et al., 2018). 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).

According to Ruban (2010), geosites maybe rank local, regional, national, or global which depending on the territorial uniqueness of the represented geological phenomena. Furthermore, the rank is determined by the comparison with other geosites known on the local (city), provincial, national (country), or global levels. Višnić et al. (2016) mentioned that the determination of geosites at which investment should be provided, so the future geotourism destinations are most likely to be successful. The geosite requires appropriate management procedures to keep and increase its value (Henriques, 2015). This leads to the first hypothesis which is:

H1: There are statistically significant effects of natural and geological resources on increase the demand of Hassana Dome Protected Area.

Geotourism site management

Dwyer and Kim (2003) focused on those activities which implement the policy and planning framework established under destination policy, planning and development, marketing management, human resource development, environmental management, enhance the appeal of the core resources and attractors, strengthen the quality and effectiveness of the supporting factors and resources. These activities represent the most direct mechanism for managing the destination's competitiveness and sustainability.

It is noted that, knowing the sensitivity of geosites and geomorphosites is necessary for the prevention, fighting and diminution of the vulnerability factors action (such as characteristics and circumstances of a community, system or asset that make geomorphosites susceptible to the damaging effects of a hazard) (Grecu, 2017). The geomorphological processes such as; erosion, transport, and accumulation through the action exerted on the ground surface come to create forms/geosites sensitive to human interventions and to natural hazards (Višnić et al., 2016). This leads to the second hypothesis which is:

H2: There are statistically significant effects of site management on increase the demand of Hassana Dome Protected Area.

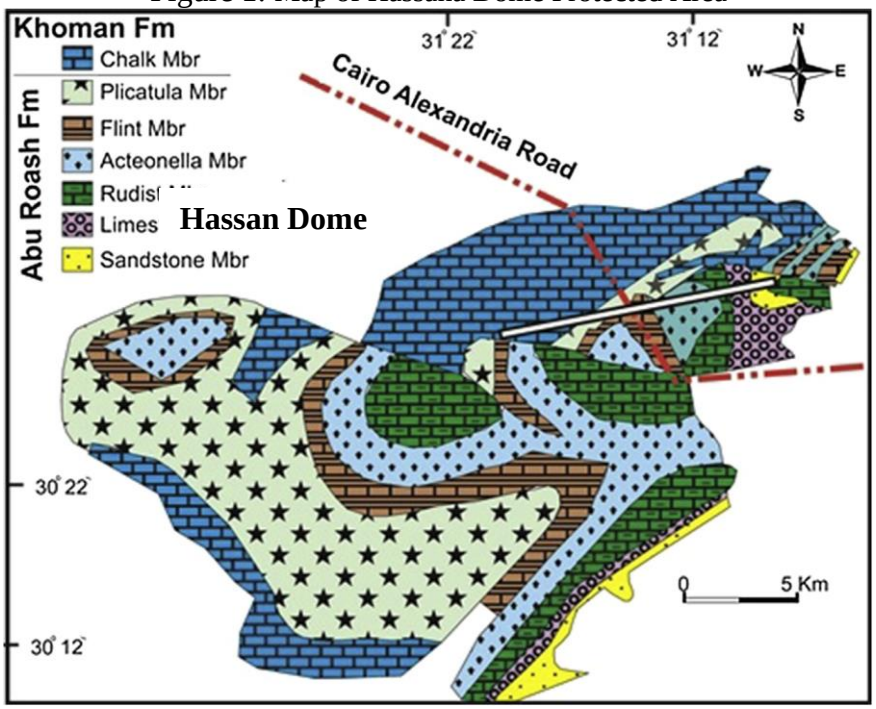
Hassana Dome Protected Area

Announced in 1989, Hassana Dome Protectorate is in the Giza governorate and covers a land area of one square km, just 23 km from Cairo. It is located on the Cairo-Alexandria road at Abu Rawash and lies around 8 km from the Great Giza Pyramids. It is also classified a geological protected area (EEAA, 2019). Hassana Dome Protected Area is a museum and specialized scientific institute that helps in studying geology and different geological formations like folds, foults; also they can be compared with similar formations in other places. The existence of fossils gathering in perfect reserved colonies makes Hassana Dome a perfect area for studying fossils science or the science of paleo life and also the features of the ancient environment and the extent of climate change which took place in the Area, especially the cretaceaus period, which characterized this area (Abdelhady and Mohamed, 2017).

The reserve's name comes from its dome-shaped hills which are located at the foot of the Hassana valley. The reserve meanwhile is divided into two by the Cairo- Alexandria highway. The highest point is 149 meters above sea level. Meanwhile, the highest point in the eastern part rises to about 109 meters above sea level. The protectorate is one of the smallest in Egypt and is not very popular among tourists. Also, the urbanization and pollution have taken a toll (Abdel-Ati and Abdel-Rahman, 1998). The New Giza housing project is located nearby. The protectorate

is referred to as a purely geological protectorate and you cannot find much here where plants, animals or wildlife is considered (Dabes, 2006) (see Figure 1).

Figure 1: Map of Hassana Dome Protected Area



(Source: Abdelhady and Mohamed, 2017)

Methodology

A single case study was applied in this research to identifying the natural and geological features of Hassana Dome Protected Area as geotourism sites and to explore the role of geosite management in increasing the demand of Hassana Dome Protected Area. This research is based on a quantitative and qualitative approach (mixed methods) since its main aim is to understand the context better from practitioners (Saunders, 2011). To obtain adequate information for achieving the research aim and objectives, two stages were considered to be the most appropriate form of data collection instruments, multiple sources of data collections, including questionnaire and direct observation to gather a mix of quantitative and qualitative data.

Data collection

The major final component in the research design is to find specific techniques of data collection. There are two basic sources of data: secondary data and primary data. The secondary sources are included: previous research; books; articles; journals; reports (Collis and Hussey, 2013). Primary data is data collected specifically for the research project being undertaken by the researcher (Saunders et al., 2009). The researcher uses two methods for data collection. Secondary methods through searching in several database sources were used to investigate previously conducted studies that talking about the geotourism sites.

This research started with quantitative research in phase one which depends on the questionnaire, in order to attain extending understanding the research topic. A questionnaire will be developed on the basis of the literature review. Finally, the qualitative researches employed in phase two via using the direct observation of study areas. A convenience sample technique was chosen in this research 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 Manger of Hassana Dome Protected Area. 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.

Piloting

Before the pilot process is performed, as Alexander (2013) recommended it is desirable to obtain the unique assessment. Andres (2012) mentioned that conducting a pilot study by involving colleagues, friends and family and other people who assume an audience role. The questionnaire was pre-testing by circulating it among 10 colleagues to find out misunderstand words or concepts. Pre-testing ensured correct phrasing, format, length and question sequence. Pre-testing was performed to ensure the initial survey reliability and to explore any potential misunderstanding among respondents related to the items wording or survey length. The questionnaire was corrected after feedback.

Measurement

The questionnaire in this research is broken into five sections. The first part consists items about the respondents demographic profiles, including; gender, age, job, and education. The second part consists of the demand of visiting Hassana Dome Protected Area. The third part consists of geotourism attractions in Hassana Dome Protected Area. Fourth part includes the geological and natural features in Hassana Dome Protected Area. Final part consists of geotourism site management, these variables were modified from Dwyer and Kim, (2003). A Likert scale was used for geological and natural features Hassana Dome Protected Area and the management of geotourism site, five point Likert scale (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree.

Results and discussions

Demographic information of respondents

Out of the 190 professional experts surveyed at Hassana Dome Protected Area, 144 (75.7%) were male and 46 (24.2%) female. The largest group of respondents (31.5%) were aged 29-38 years. The 21-28 year olds represented the second largest group (28.9%) of respondents. The 39-48 year olds represented the third largest group (25.7%) of respondents. The lowest percentage of the respondents were (13.6%) between 49-58 years old. The largest portion of the respondents had a postgraduate education (55.2%), followed by a higher level education (44.2%) (see Table 1).

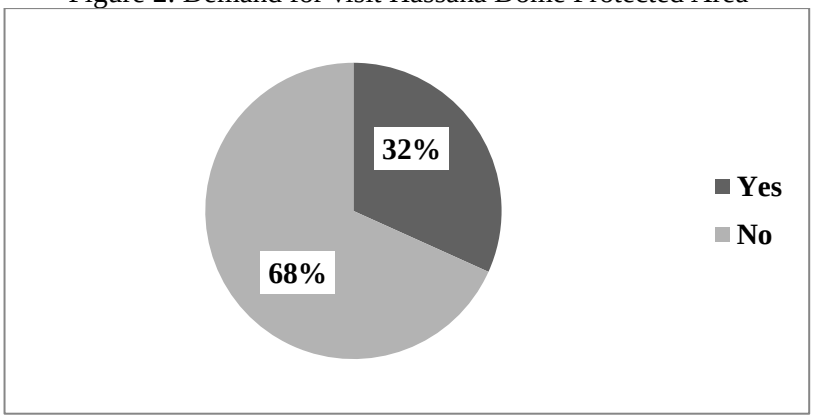
Table 1: Demographic profile

Variable		Frequency (N=190)	Percentages (%)
Gender	Male	144	75.7
	Female	46	24.2
Age	21-28	55	28.9
	29-38	60	31.5
	39-48	49	25.7
	49-58	26	13.6
	More 59	0	0
Level of Education	Higher education	85	44.7
	Postgraduate	105	55.2

Geotourism demand at Hassana Dome Protected Area

This section of the questionnaire was aimed to collect information related to the demand of visiting Hassana Dome Protected Area. The respondents were asked *is there demand for visiting Hassana Dome Protected Area?* The participants were answering with *yes* or *no*, depending on their view. 129 (68%) of the respondents were said *no*, 60 (32%) of the respondents were said *yes* (see Figure 2).

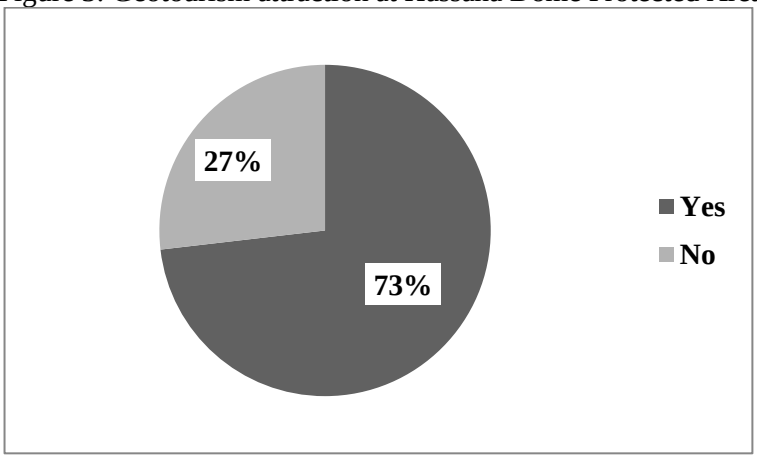
Figure 2: Demand for visit Hassana Dome Protected Area



Geotourism attraction at Hassana Dome Protected Area

The respondents were asked, *does Hassana Dome Protected Area have an attraction to be considered a geotourism site?*139 (73%) of the respondents were answer *yes*, that Hassana Dome Protected Area have attractions such as fossils, rocks, mountains, and fossilized trees, that help it to be considered as a geotourism site. While 51(27%) of the participants were answer *no* (see Figure 3).

Figure 3: Geotourism attraction at Hassana Dome Protected Area



Natural and Geological resources in Hassana Dome Protected Area

The results in table (2) showed that the mean scores for the natural and geological resources in Hassana Dome protected range from 4.03 to 4.240. The standard deviations for the responses to the items measuring it ranged between 0.53 to 0.68 displays a reasonable level of variability. The results reported that the grand mean of the natural and geological resources variables were 4.14, comparing that mean with the 5-piont 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 (4) strongly agree and it closed by the choice number (4). These mean statistics show the

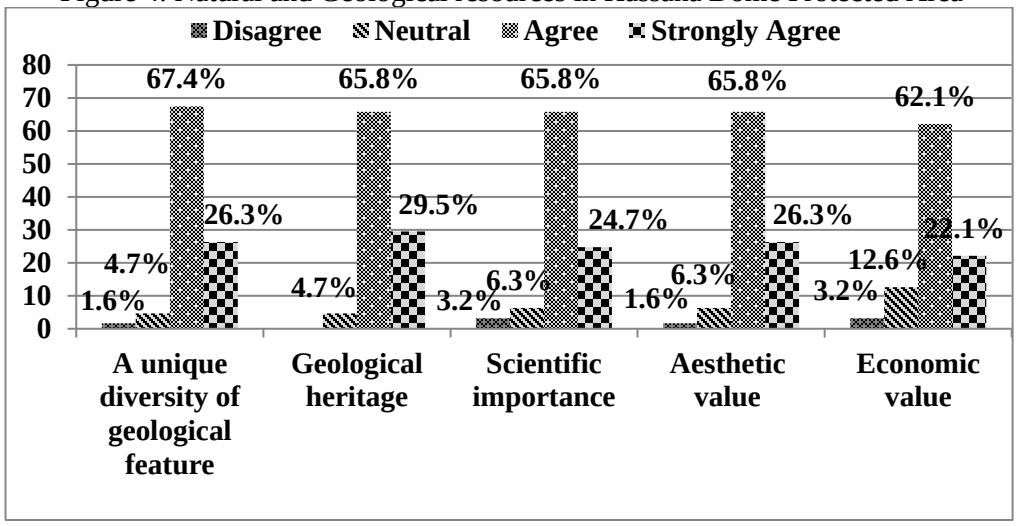
agreement of the participants for the natural and geological resources in Hassana Dome Protected Area. This result matched with the literature review the geotourism play a vital role in enhancing the economic development in the potentials geosites and contributing to the sustainable development within these geosites (McKeever et al., 2006).

Table 2: Mean and Standard Deviation of the Natural and Geological resources in Hassana Dome Protected Area

Natural and Geological resources in Hassana Dome Protected Area	Mean	Std. Deviation	Number of responses (n=190)
1. Hassana Dome protected area is characterized by unique diversity in geological and geomorphological aspects.	4.18	0.58	190
2. Hassana Dome protected area has a history and geological importance.	4.24	0.53	190
3. Hassana Dome protected area has an interest to scientists and researchers.	4.12	0.65	190
4. Hassana Dome protected area has an aesthetic value that targets tourists.	4.16	.600	190
5. Hassana Dome protected area has economic value.	4.03	0.68	190
Statistics for all Variables	4.14	0.60	190

Additionally, Figure (4) indicated the participant agreement regarding to the endowed resources Hassana Dome protected area. The results showed that (95.3%) of the respondents were agreed that Hassana Dome protected area has a history and geological heritage. (94.1%) of the respondents were agreed that the area of Hassana Dome has an aesthetic value that targets tourists. Followed by (93.7%) of the respondents were agreeing that Hassana Dome protected area is characterized by unique diversity in geological and geomorphological aspects. (90.5%) of the respondents were agreed that the area of Hassana Dome has an interest to scientists and researchers. (84.2%) of the respondents were completely agreed that the area of Hassana Dome has economic value.

Figure 4: Natural and Geological resources in Hassana Dome Protected Area

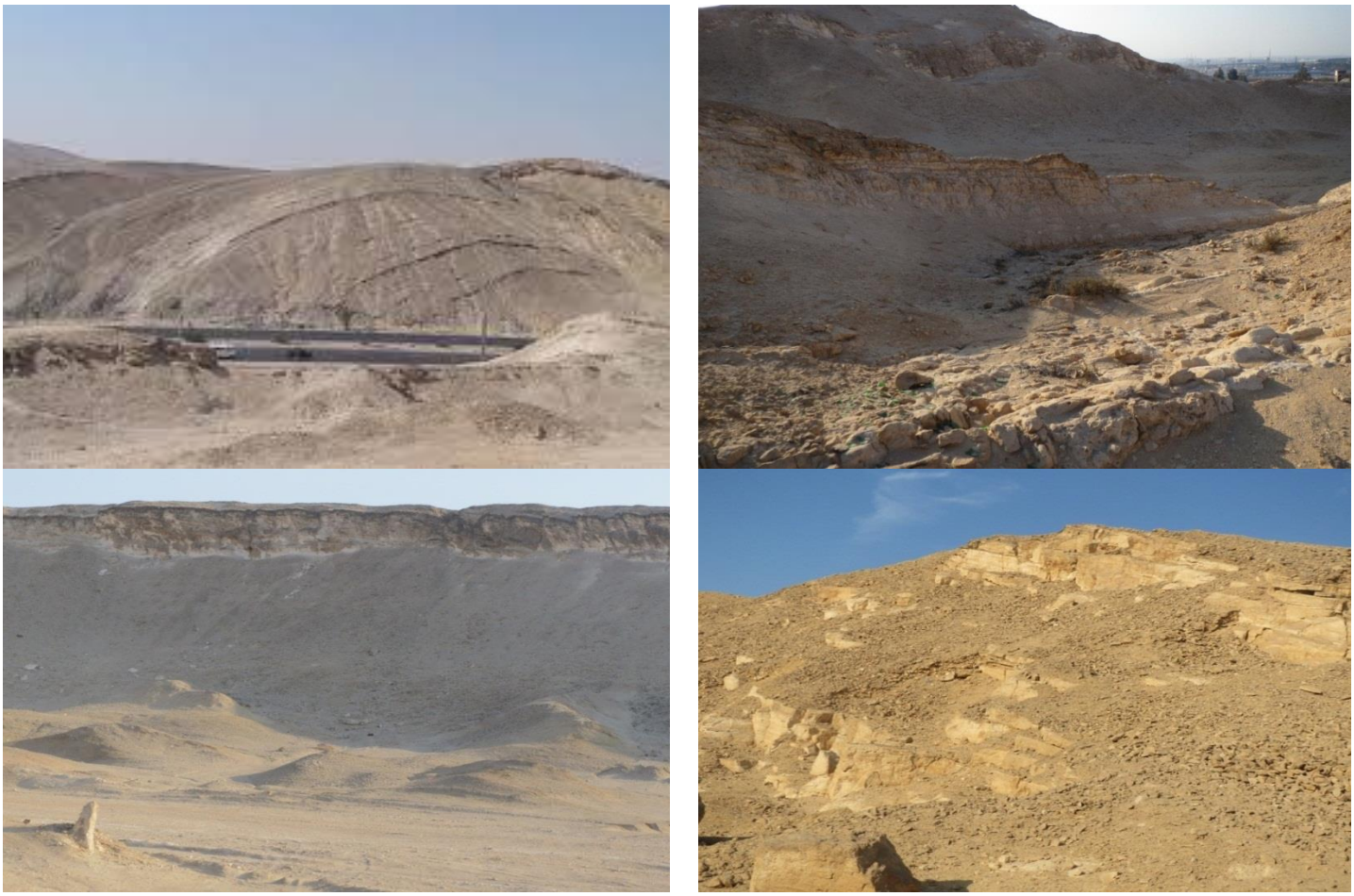


According to Newsome (2006) there are many geological interesting places and features have become tourism attraction places such as landscape, landforms, mountains, fossils (Errami et al., 2015), soils, rocks ,and the use of stone and minerals by humans. Also, Johnson et al. (2010)

classified geotourism in to: Geological (craters, lava caves, islets, mountains, waterfalls, coastlines, coral reefs, beaches, cliffs) and Geomorphological sites, Anthropological (in caves and mines) sites, Geothermal and volcano destinations, and Geological heritage.

In addition, the direct observation used to identify the natural and geological features in Hassana Dome Protected Area and to explore the actual situation in Hassana Dome Protected Area. The observation reported that Hassana Dome Protected Area is characterized by a diversity of natural, geological and geomorphological features (see Figure 5). The distinguished history of Hassana Dome is depicted in its topographical merits and its geological makeup. It's the only reserve near Cairo that has remnants from the crustaceous age dating back to about one million years. The rocks found here belong to the Stone Age and are believed to have been formed 60 million years back and from the rocky age about 40 million years back (Abdel-Ati and Abdel-Rahman, 1998).

Figure 5: Diversity of geological forms in Hassana Dome Protected Area



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

The observation noted that Hassana Dome was formed as a result of the process of folding which occurred in the late Cretaceous period due to the movement of the Syrian arches. The area of Abu Rawash became topographically irregular in the sense that it is high in places such as Hassana Dome and low in other places. This increase has a clear effect on sedimentation conditions after the cretaceous period. Where the area was exposed to a number of faults and folds, which led to the increase of rough terrain of the region (see Figure 6).

Figure 6: Cracks and Folds in Hassana Dome Protected Area

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

Additionally, the observation noted that there is a closed museum in Hassana Dome containing the different types of rocks and fossils located in the sanctuary of Hassana Dome, showing the complete record of the old life and environment and climate during the Cretaceous era, and the museum is characterized by the existence of types of fossils of various species and species of the tribe of molluscs, including shellfish and sponges (see Figure 7).

Figure 7: Closed Museum in Hassana Dome Protected Area

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

Consequently, the direct observation confirmed and matched with the results in Table (2) and figure (5) that Hassana Dome Protected Area is characterized by unique diversity in geological and geomorphological, it has a history and geological importance, it has an interest to scientists and researchers, and it has an aesthetic value that targets tourists. This matched with the study of Dowling (2011) explained that geotourism can enhance the local economy by providing and increasing the chances of work for the local community, developing the different sorts of productions of the local groups, and supporting the income sources for an area's adjacent geosites. It also can strengthen the relationship between the local communities and their land.

For testing the first hypothesis: *there are statistically significant effects of natural and geological resources on increase the demand of Hassana Dome Protected Area.*

The results in the following table (3) of interest are the Model Summary. This table provides the R, R2, adjusted R2, 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^2) was (0.782) for natural and geological resources of geotourism sites in Hassana Dome Protected Area. The percentages of the determination coefficient (R^2) were (78%) in Hassana Dome Protected Area. This means that there is a strong impact of the independent variable (natural and geological resources on increase the demand of Hassana Dome Protected Area) 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 3: Results of Multiple Regression Analysis of Natural and Geological Resources

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.250[a]	0.782	0.061	0.45156

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 (2, 178) = 5.863 *Sig.* = 0.003, so there was effect of natural and geological resources to increase the demand of Hassana Dome Protected Area.

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.391	2	1.196	5.863	0.003[a]
	Residual	35.888	178	0.204		
	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 Hassana Dome Protected Area						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.463	0.547		7.275	0.012
	A unique diversity in geological features	2.026	0.055	0.052	4.622	0.016
	Geological heritage	1.039	0.060	0.018	2.562	0.007
	Scientific significance	2.088	0.071	0.090	1.781	0.012
	Aesthetic value	1.126	0.062	0.060	2.363	0.013
	Economic value	1.099	0.079	0.040	1.582	0.002
a. Dependent Variable: Enhance demand of Hassana Dome Protected Area.						

The results indicated that the regression determination in the following table, it was found that the constant coefficient *B* = 2.026, *Sig.* = 0.016 for a unique diversity in geological features, *B* = 1.039, *Sig.* = 0.007 for geological heritage, *B* = 2.088, *Sig.* = 0.0192 for scientific significance, *B* = 1.126, *Sig.* = 0.013 for aesthetic value, *B* = 1.099, *Sig.* = 0.002 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 natural and geological resources was ranged from *T* = 4.622 to *T* = 1.582, *Sig.* = 0.002 to *Sig.* = 0.016 at a significant level less than (0.05). Therefore, there was effect of endowed resources on increase the demand of Hassana Dome Protected Area. Therefore, the results revealed that there are statistically significant effects of natural and geological resources on increase the demand of Hassana Dome Protected Area. The study refused the null hypothesis and accepted the alternative one, which declared that there are significant effects of natural and geological resources on increase the demand of Hassana Dome Protected Area.

Geotourism site management in Hassana Dome Protected Area

In term of the geotourism site management in Hassana Dome Protected Area, the respondents were asked to evaluate their agreement with the scale ranging from 'strongly disagree' (1) to 'strongly agree' (5). The results in table (4) showed that 161 (84.8%) out of 190 of the respondents representing their strongly disagreed and disagreed that the employees are trained to carry out the guidance process within Hassana Dome Area. 152 (80.4%) of the respondents were strongly disagreed and disagreed that there are suitable programs to promote tourism awareness of the importance of geotourism sites. Followed by 149 (78.5%) of the respondents were strongly disagreed and disagreed that the plan for development of Hassana Dome protected area. 136 (71.6%) of the respondents indicated their disagreement that local community involved in the development of Hassana Dome Protected Area. The results showed that 135 (71%) of the respondents were disagreed with cooperation between the Tourism Promotion Authority, the EEAA and the tourism companies and marketing of new tourism products such as geotourism. 117 (61.6%) and 109 (57.4%) of the respondents were disagreed that the environmental protection laws applied in Hassana Dome Protected Area and marketing plan for the promotion of Hassana Dome Protected Area respectively. As well, the results indicated that the lowest percentage 93 (48.9%) of the respondents were agreed that there is a budget to be set up to manage Hassana Dome area.

Table 4: The results of geotourism site management in Hassana Dome Protected Area

Geotourism site management in Hassana Dome Protected Area		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. There is a marketing plan for the promotion of Hassana Dome protected area.	Freq.	27	82	30	43	8
	%	14.2	43.2	15.8	22.6	4.2
2. There is cooperation between the Tourism Promotion Authority the EEAA and the tourism companies for the marketing of Hassana Dome protected area.	Freq.	31	104	37	15	3
	%	16.3	54.7	19.5	7.9	1.6
3. There is a plan for development of Hassana Dome protected area.	Freq.	48	101	20	16	5
	%	25.3	53.2	10.5	8.4	2.6
4. The local community will be involved in the development and marketing plans of Hassana Dome protected area.	Freq.	35	101	45	6	3
	%	18.4	53.2	23.7	3.2	1.6
5. Environmental protection laws and the application of the concept of sustainability within Hassana Dome area shall be applied.	Freq.	30	87	22	40	11
	%	15.8	45.8	11.6	21.1	5.8
6. The employees are trained to carry out the guidance process within Hassana Dome area.	Freq.	60	101	21	7	1
	%	31.6	53.2	11.1	3.7	0.5
7. There is a budget to be set up to manage Hassana Dome area.	Freq.	13	40	44	85	8
	%	6.8	21.1	23.2	44.7	4.2

Geotourism site management in Hassana Dome Protected Area		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
8. Development and marketing of new tourism products such as geotourism.	Freq.	39	96	29	22	4
	%	20.5	50.5	15.3	11.6	2.1
9. There are suitable programs to promote tourism awareness of the importance of geotourism sites.	Freq.	48	104	32	3	2
	%	25.4	55	16.9	1.6	1.1

The following table (5) showed that, the mean scores for geotourism site management in Hassana Dome area range from 1.88 to 3.18. The standard deviations for the responses to the items measuring it ranged between 0.76 to 1.15, which displays a reasonable level of variability. The results reported that the grand mean of geotourism site management in Hassana Dome protected area were 2.32, 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 (3) natural (2) disagree, and it closed by the choice number (2). These mean statistics show the disagreement of the participants for the geotourism site management in Hassana Dome protected area.

Table 5: Mean and Standard Deviation of geotourism site management Hassana Dome Protected Area

Geotourism site management in Hassana Dome Protected Area	Mean	Std. Deviation	Number of responses (n=190)
1. There is a marketing plan for the promotion of Hassana Dome Protected Area.	2.59	1.11	190
2. There is cooperation between the Tourism Promotion Authority, the EEAA and the tourism companies for the marketing of Hassana Dome Protected Area.	2.23	0.87	190
3. There is a plan for development of Hassana Dome Area.	2.10	0.96	190
4. The local community will be involved in the development and marketing plans of the Hassana Dome Protected Area.	2.16	0.81	190
5. Environmental protection laws and the application of the concept of sustainability within the Hassana Dome Protected Area shall be applied.	2.55	1.15	190
6. The employees are trained to carry out the guidance process within Hassana Dome Protected Area.	1.88	0.78	190
7. There is a budget to be set up to manage Hassana Dome Protected Area.	3.18	1.03	190
8. Development and marketing of new tourism products such as geotourism.	2.24	0.97	190
9. There are suitable programs to promote tourism awareness of the importance of geotourism sites.	1.97	0.76	190
Statistics for all Variables	2.32	0.93	190

In term of marketing and promotion plan the literature review highlighted that geosite should promote its products to its visitors through making of local handicrafts such as the production of fossil casts and souvenirs by local enterprises (Mulec and Wise, 2012). Geosite should have various recreation activities that help raise public awareness about the geotourism concept,

important and value of geosite (Zouros, 2009). The results noted that the respondents were completely disagreeing that there are marketing activities and promotion plan for Hassana Dome Protected Area. However, these results matched with the study of Sallam et al. (2018), reported that there is not marketing or promotion plan for promoting Hassana Dome Protected Area and the observation confirmed that the area of Hassana Dome Protected Area did not have any promotion activities.

Additionally, the observation noticed that there is no of pamphlet and brochures in Hassana Dome Protected Area. The results matched with, Neto de Carvalho and Rodrigues (2009) there is a lack of interpretative information available to visitors and no coordination to ensure geosites management. In term of the cooperation between the Tourism Promotion Authority and Egyptian Environmental Affairs Agency (EEAA) and tourism companies, the results reported that the respondents were disagreeing for this statement. The observation noted that there aren't regulations to protect the environment within Hassana Dome Protected Area. The observation reported that the area of Hassana Dome did not have any promotion activities.

For testing the second hypothesis***:*** *There are statistically significant effects of geotourism site management on increase the demand of Hassana Dome Protected Area*, the study was used Multiple Regression Analysis for measuring the effect of site management on increase the demand of Hassana Dome Protected Area see Table 6.

Table 6: Results of Multiple Regression Analysis of geotourism Site Management

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.242[b]	0.610	0.048	0.44536

a. Predictors: (Constant), Marketing plan, cooperation between the Tourism Promotion Authority, the EEAA and the tourism companies, development plan, local community, environmental law, trained employee, budget, marketing new tourism, programs to promote tourism

The results in the previous table of interest are the Model Summary. This table provides the R, R2, adjusted R2, 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^2) was (0.610) for site management of geotourism sites in Hassana Dome Protected Area. The percentages of the determination coefficient (R^2) was (61%) in Hassana Dome Protected Area. This means that there is a strong impact of the independent variable (site management) on the dependent variable (increase the demand of geotourism sites), 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.

ANOVA[e]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.216	2	1.108	5.585	0.004[b]
	Residual	35.504	181	0.198		
	Total	37.720	183			

a. Predictors: (Constant), Site management in Hassana Dome Protected Area

b. Dependent variable: Enhance demand of Hassana Dome Protected Area

The results in the following table showed the Variance Analysis, the results showed that F (2, 181) = 5.585, Sig. = 0.004, so there was effect of site management to increase the demand of Hassana Dome Protected Area.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.232	0.530		6.275	0.000
There is a marketing plan for the promotion of Hassana Dome Protected Area.	1.046	0.352	0.064	3.622	0.002
There is cooperation between the Tourism Promotion Authority, the EEAA and the tourism companies for the marketing of Hassana Dome Protected Area.	1.035	0.452	0.056	2.176	0.013
There is a plan for development of Hassana Dome Area.	2.064	0.043	0.077	1.293	0.014
The local community will be involved in the development and marketing plans of the Hassana Dome Protected Area.	1.066	0.061	0.066	2.506	0.006
Environmental protection laws and the application of the concept of sustainability within the Hassana Dome Protected Area shall be applied.	1.025	0.056	0.072	1.252	0.007
The employees are trained to carry out the guidance process within Hassana Dome Protected Area.	2.172	0.046	0.064	3.622	0.004
There is a budget to be set up to manage Hassana Dome Protected Area.	2.012	0.073	0.090	2.176	0.003
Development and marketing of new tourism products such as geotourism.	1.077	0.073	0.073	1.293	0.011
There are suitable programs to promote tourism awareness of the importance of geotourism sites.	2.053	0.064	0.072	2.506	0.004

a. Dependent Variable: Enhance demand of Hassana Dome Protected Area

Additionally, in view of the regression determination table, it was found that the constant coefficient *B* = 1.046, *Sig.* = 0.002 for marketing plan for the promotion of Hassana Dome Protected Area, *B* = 1.035, *Sig.* = 0.013 for cooperation between the Tourism Promotion Authority, the EEAA and the tourism companies for the marketing of Hassana Dome Protected Area, *B* = 2.064, *Sig.* = 0.077 for There is a plan for development of Hassana Dome Area, *B* = 1.066, *Sig.* = 0.006 for The local community will be involved in the development and marketing plans of the Hassana Dome Protected Area, *B* = 1.025, *Sig.* = 0.007 for Environmental protection laws and the application of the concept of sustainability within the Hassana Dome Protected Area shall be applied, *B* = 2.172, *Sig.* = 0.004 for The employees are trained to carry out the guidance process within Hassana Dome Protected Area, *B* = 2.012, *Sig.* = 0.003 for There is a budget to

be set up to manage Hassana Dome Protected Area, *B* = 1.077, *Sig.* = 0.073 for Development and marketing of new tourism products such as geotourism, *B* = 2.053, *Sig.* = 0.004 for There are suitable programs to promote tourism awareness of the importance of geotourism sites. 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 sit management was ranged from *T* = 2.172 to *T* = 1.035 *Sig.* = 0.002 to *Sig.* = 0.014, so there was effect of site management on increase the demand of Hassana Dome Protected Area.

Therefore, the results revealed that there are statistically significant effects of site management on increasing the demand of Hassana Dome Protected Area. The study refused the null hypothesis and accepted the alternative one, which declared that there are significant effects of site management on increasing the demand of Hassana Dome Protected Area.

Conclusion and further research

The results showed that there was no demand for visiting Hassana Dome Protected Area. However, the area of Hassana Dome Protected has an attraction that helps it to be geotourism sites. Also, the finding found that the participants disagreed with the created resources variables in Hassana Dome Protected Area. As well, the results reported that the participants were completely agreed with natural and geological resources variables in Hassana Dome Protected Area. The observation reported that Hassana Dome Protected Area is characterized by a diversity of natural, geological and geomorphological features. Also, the observation noted that there is a closed museum in Hassana Dome containing the different types of rocks and fossils located in the sanctuary of Hassana Dome. It has an interest to scientists and researchers, and it has an aesthetic value that targets tourists.

Additionally, the results reported that there is no marketing activities or promotion plan for promoting Hassana Dome Protected Area. Also, it noticed that there is a no pamphlet and brochures in Hassana Dome Protected Area. It also revealed that there are no regulations to protect the environment within Hassana Dome Protected Area. This research has several limitations were, firstly, this research focused on one case study of Hassana Dome Protected Area. Secondly, the literature showed there had been clear lack of prior research studies on geotourism site in Egypt, in particularly Hassana Dome Protected Area. Future research should address more geosites in Egypt; it also should undertake to test the findings of this research.

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