The Application of the 4-D Movie Theater System in Egyptian Museums for Enhancing Cultural Tourism

Hend M. Hamed & **Rehab A. Hema**
Tourism Dept., Faculty of Tourism & Hotel Management,
Helwan University, Cairo, Egypt

Abstract: This study suggests that by using the 4 dimension (4-D) movie theater system, as a new interactive method to replace the traditional methods of storytelling used in the Egyptian museums, cultural tourism would have better chances of enhancement in Egypt. Further more, the study presents a hypothetical example or a model to show how these systems can be exploited effectively in demonstrating ancient egyptian legends, representing them in a more dynamic and lively way. In addition, it recommends implementing the 4-D movie theater system in the new Grand Egyptian Museum as it is still in the construction phase which may permit doing changes in its designing plan to add a 4-D movie theater in it.

Keywords: 4-D movie theater systems, storytelling styles/methods, museums.

Introduction

Depite the advantage of being classy, maintaining a special identity among other institutions, museums are no longer seen as "the room of wonders" (Sparacino, 2004a) that holds collection of items to impress the viewer (King, 1991; Sparacino, 2004a).What appeal and interest the viewer these days is the way of presenting the items that the museum encompasses and the storytelling style used to interpret and communicate them. Traditional storytelling supports for museums have been: signs and text labels, exhibit catalogues, guided tours, audio tours and more recently video or multimedia kiosks with background information on the displayed objects (Davenport, et al., 2000; Sparacino, 2004a).

Tourists paying visits to museums these days seek an experience that combines both intellectual aspects, such as the elaboration of background and new knowledge, and emotional aspects such as satisfaction and the fascination with the museum exhibits (Alfaroet al., 2004). They hope to feel the same pleasure that they experience during their visit to entertainment institutions such as cinemas, theaters and theme parks.

New interactive and multimedia exhibition technologies are merely the means for museums to fulfill these tourists' desires. One of the most

© 2009 by CMTHS-HNB Garhwal University, India & University of Southern Mississippi, USA.

important interactive technological methods that can be used to convert a museum into an "interactive narrative space" (Sparacino, 2004b), able to compete with other entertainment places and attract and entertain its visitor, is the 4-D movie theater system that creates a sense of wonder, curiosity, emotion and surprise to the visitor drawing his full attention to the objects on the show.

By using the 4-D movie theater system, museums can transfer its educational message to its visitors in a more effective way by leaving a deep emotional impression on them, as these technologies give the chance to the visitors to be a part of the narrated story and interact with it through their senses of seeing, hearing, smelling and moving (Sparacino, 2004a; Turnkey, 2008).

This paper highlights the usefulness of using the 4-D movie theater system in Egyptian museums as a method of renewing the currently used storytelling methods to enhance the growth and development of cultural tourism in Egypt.

Cultural Tourism

Cultural tourism has been one of the most important types of tourism for centuries. It involves, according to the definition of The World Tourism Organization (WTO) in 1985, "The movements of persons for essentially cultural motivations such as study tours, performing arts and cultural tours, travel to festivals and other cultural events, visits to sites and monuments, travel to study nature, folklore or art, and pilgrimages." (Canadian Heritage, 2006:1).Travelers who engage in cultural tourism activities visit : art galleries, music concerts, theaters, museums, historic sites, cultural events, festivals, fairs, ethnic communities, architectural and archaeological treasure, animal/ marine parks and botanical gardens (The National Centre for Culture and Recreation Statistics of the Australian Bureau of Statistics, 2001; National Assembly of state art agencies, 2008).

Despite of this wide range of components that cultural tourism encompasses, its market share is considered to be small, as according to Greg Richards, co-coordinator of the ATLAS Cultural Tourism Research Project, that the market size of cultural tourism worldwide is approximately 5-8% only, if the narrow term of cultural travelers is used which only includes those who are motivated by culture and specifically go on holiday to visit a cultural attraction (Canadian Heritage, 2006: 6).One of the main reasons

for this is that the international tourism has gradually been directed towards recreation and entertainment, as the tourist began to prefer going to a theme park such as Disneyland where he can have the opportunity to become a player in a cultural or historical version of mythic events rather than visiting a museum and become just an observer or a passive viewer (King, 1991 ; Baron 1995; Mirski & Abfalter, 2004).Tour operators began realizing this matter and started concentrating more on recreational tourism, while some of them tried to include one or more cultural component in their pleasure trips until these trips formed 37% of all leisure trips worldwide(Majo, Marrtinez & Vazques, 2004: 2).

New trends have also emerged calling for the necessity of reshaping the cultural tourism concept to be an entertaining and educational experience **(**Canadian Heritage, 2006; The National Centre for Culture and Recreation Statistics of the Australian Bureau of Statistics, 2001: 2) in order to be able to survive among other types of tourism. Among these trends is the motivations regarding cultural tourism that has become increasingly based on pleasure, learning, experience and enjoyment of a hobby or an interest (Canadian Heritage, 2006). These trends have caused a shift from tangible attractions, such as museums and monuments, towards intangible attractions and experiences, such as theatres and festivals. (Canadian Heritage, 2006).Thus, the tangible attractions or components of cultural tourism, especially museums, are actually facing a challenge concerning attracting and retaining tourists by remaining static, and lifeless (King, 1991; Davenport et al , 2000). One of the benefits of using the 4-D movie theater system is that it can convert a museum into a dynamic and amusing place able to compete with theme parks and other entertainment institutions.

The 4-D movie theater system

Definition

The term 3-D is used to describe any visual presentation system that attempts to create the illusion of depth in an image as seen by the viewer (Eusebeîa organization, 2008; 3-D Review magazine, 2008).The 4-D movie theater system represents an entertainment presentation system that combines synchronized physical effects, such as rain, wind and vibration, with a 3-D animation movie allowing the spectators to react with the events intellectually, emotionally and even physically (Davenport et al, 2000; Lee, 2001;Star Trek, 2004; Coinline, 2007; MotionBase 2008; Becker, 2008). It

is considered to be one of the applications of virtual reality (Goldstein, 2001; Messner, Yerrapathruni, Baratta & Whisker, 2003; Brandel, 2006).

The Components of a 4-D theater system

A typical 4-D movie theater system, as shown in figure (1), encompasses the following:

Smart chairs

These are dynamic motion seats producing combined sensation effects (Yardeni, 2008).

Physical effects

This involves the use of sensory effects to simulate actions seen on the screen including atmospheric, motion, tickling and scent effects (Coinline, 2007; Metropolis entertainment, 2008; MotionBase , 2008; MediaMation, 2008).

Audio/Visual equipments

This includes the surround sound theater system, audio seat transducers, speakers, 3-D projectors, 3-D video,3-D glasses and displays (Coinline 2007; Calvache, 2008; Media Mation 2008; Real, 2008; Clatworthy, 2008; Philips, 2008).

Audio/Visual software production

This involves software systems required for the production of the 3-D animation film (Coinline, 2007; Metropolis Entertainment, 2008).

A control System

This involves a specialized computer system running custom software providing the sequencing, timing, and duration of all the selected 4D effects. (MotionBase, 2008).

Support Equipments

This includes the compressed air and high pressure water needed for some of the seateffects and the audio amplifiers. (MotionBase, 2008).

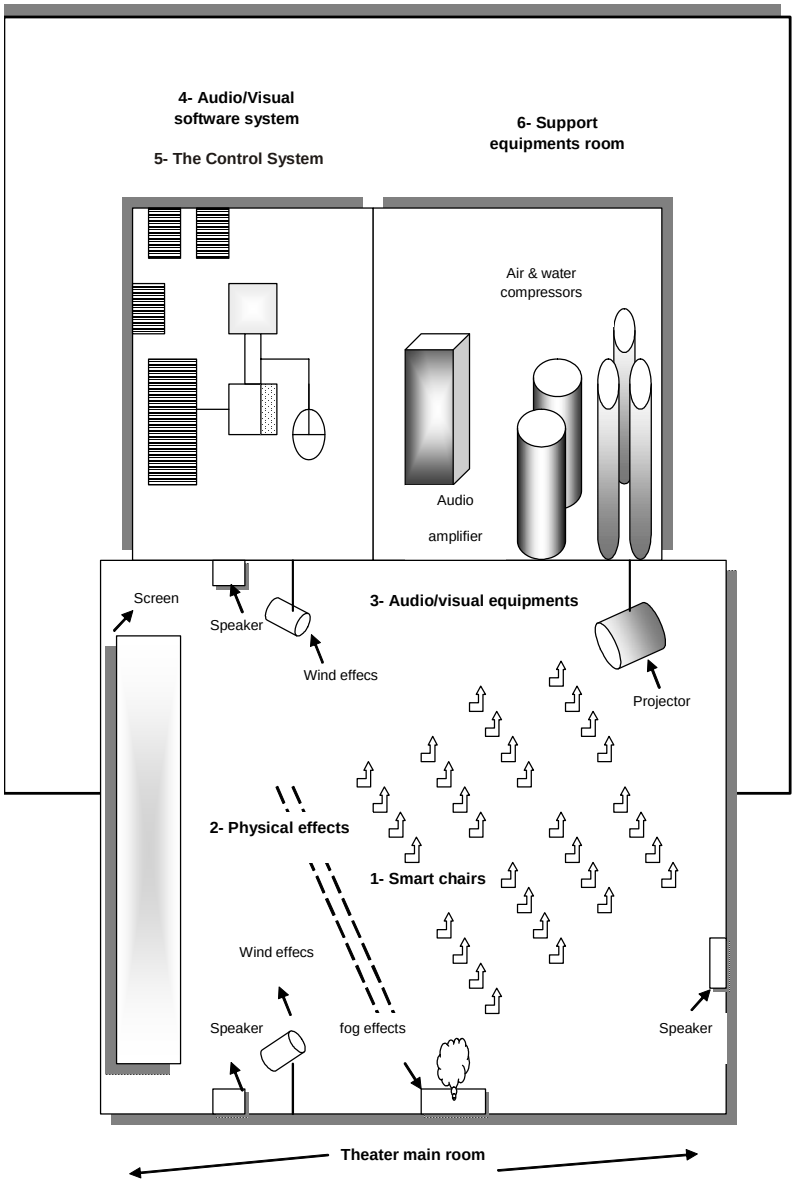

Figure (1): The Components of a 4-D theater system

The 4-D movie theater system applications worldwide

Theme parks, especially Disneyland worldwide, were the first institutions to use the 4-D movie theater systems in the 90s (King, 1991; Baron, 1995;

Calvache, 2008: 16). Meanwhile, other entertainment and cultural institutions started taking the same path as a way of attracting and impressing visitors by merging education and entertainment together to create an "edutainment" experience (Mirski & Abfalter, 2004:599). Among these institutions are: Waterparks, cinemas and science museums. The main driver behind implementing a 4-D theater system for most of those entertainment and educational institutions was to reach new audience and encourage repeat visits to the institution by introducing an innovative way of presentation. From this perspective, all these implementations of the 4-D theater systems have been extremely successful and a failure experience has never been reported up till now (Reid, 2008)._The following are some of the most famous and successful implementations of 4-D theater systems worldwide:

Disney Resorts' and Universal Studios' 4-D theaters worldwide

The Walt Disney World Resorts represent the most successful experience in implementing the 4-D movie theater systems. Since the 90s, many Disney's theme parks worldwide started introducing 4-D shows that have proven to be successful so far such as the show of "Honey I shrunk the audience" and "It's Tough to be a Bug" (Alcorn McBride, 2009;Walt Disney world, 2009).In addition to the Universal Studios experience in 2003 with its famous 4-D show "Shrek 4-D" featured in Universal Studios in many locations worldwide (Universal Studios, 2009).

The Sentosa 4D Magix

The Sentosa 4D Magix is Singapore's first and Southeast Asia's largest 4-D theatre (Sentosa Island, 2008:1). Since its opening in January 2006, it has driven over half a million visitors 75 % of them were tourists (Sentosa, 2008).

Noah's Ark Dive-In Theater

In 2007, Noah's Ark, America's largest water park located in Wisconsin Dells, installed a 4-D movie theater system that receives 700 guests every hour (Wilkes and Krampf, 2007).

The 4D theater at The Science Museum of Minnesota in St. Paul

The museum installed a 4-D theater in 2003 to offer its visitors the latest available technology. The theater receives about 120,000 visits annually (Reid, 2008).

The McGovern 4-D theater at The Health Museum

In 2008, The John P. McGovern Museum of Health and Medical Science in Houston announced the opening of its 4-D theater. Jon Iszrd, the museum president declared that The McGovern 4-D theater brings a new dimension to science education as it presents science in both an educational and entertaining way (The Health Museum, 2008).

In Egypt, no entertaining or educational institution can be found in the meantime that comprises a 4-D theater system. Only the Planetarium Science center in Bibliotheca Alexandrina or Alexandria's Library encompasses an IMAX theater that does not provide any 3D shows or any physical effects (Bibliotheca Alexandrina, 2009).

The study

The Egyptian museums, especially those concerned with the Ancient Egyptian or Pharaonic history, encompass unique and precious items and collections that can never be seen elsewhere in the whole entire world. Each item, either a statue for a king or queen, a sculpture for a god or goddess, a piece of furniture or jewelry, has a wonderful story behind it that is worth to be told featuring a history of glory. Yet the storytelling methods followed in these museums are the static traditional ones that depend on guided tours, labels and catalogs. Employing the 4-D movie theater system in demonstrating many of these stories will help in expanding and brightening their value, as it will bring the characters of the story to life again, through the 3-D animation and the accompanied physical effects, allowing the spectators of all ages to interact with them and be a part of the story through their senses of hearing, seeing, smelling and moving (Turnkey, 2008).

Methodology

Driven by the idea of using an innovated presentation style generally and using the 4-D movie theater system as a lively method for remodeling the storytelling styles used in the Egyptian museums specifically, this study has tried to select an ancient Egyptian story to focus on and try to represent it as a hypothetical example or a model for how a 4-D movie theater system can be used to demonstrate the ancient Egyptian history. In this stage, the study has finally chosen legends in particular for their magical and immersive inspirations that suit the 4-D movie production, giving the physical effects a wide scale to elaborate and emphasize the events and introduce the characters in a more lively manner through the 3-D animation instead of

just narrating the story in front of their static statues .This is assumed to help in generating a sense of wonder, curiosity and genuine interest in the story during the show and leaving a deep emotional impression and a strong positive impact on the spectators after their visit to the museum that helps in preserving the museum educational message behind the story in the visitors' minds forever (Sparacino, 2004).

The study has chosen the legend of Isis and Osiris, as one of the most popular and essential legends in the ancient Egyptian history, and tried to describe how its details and events can be demonstrated through the 4-D movie theater system in order to represent it in a more lively way that serves the museum educational message and at the same time fulfill the spectator intellectual and emotional desires for edutainment.

The legend of Isis and Osiris encompasses many characters, however, the study will concentrate mainly on three of them: Isis goddess of charm and motherhood (Eternal Egypt, 2008a), Osiris the good and benevolent god (Eternal Egypt, 2008b) and Seth the god of confusion and disorder (Eternal Egypt, 2008c).

The use of 3-D animation techniques is supposed to bring these characters to life. It should be taken into consideration in the designing phase to keep as closer as possible to the general features of each character as illustrated or described in references.

Then comes the role of the physical effects in the 4-D movie theater system to enable the spectator to feel every physical detail described in the events of the legend at the same time of its demonstration in the 3-D animation movie through his senses of seeing, hearing, smelling and moving to ensure the spectator total interactivity with the events, taking him as if by magic to the heart and core of the story, enjoying its different episodes in a unique lively way.

In the following paragraphs, the study will represent Isis and Osiris legend while describing how the physical effects can be employed in some details of the story to let the audience feel their physical presence in the scene.

The application of the 4-D physical effects on Isis and Osiris legend

The legend or myth of Isis and Osiris starts with the story of creation that was developed in Heliopolis featuring the god Re as first and main

figure, from whom the other gods of the Ennead of Heliopolis evolved. In the story of creation the idea was that the first of the gods evolved out of chaos and darkness and caused order to the disordered universe. In the beginning were the primeval waters, named Nun. Out of the water Re raised himself on a hill and created himself.

Here, water splashes and upward motion of seats can give the needed effects describing Re creation.

At the moment of his creation nothing else existed until Re embraced his own shadow forming his children and spat them out: Shu was to be the god of the air and Tefnut the goddess of the mist. This act resulted in the immediate existence of light and diffusion of chaos.

At this part, water droplets can give a funny feeling to the audience at the moment when RE spits his children. Then air effects would show the birth of his son Shu, while mist and fog effects would show the birth of his daughter Tefnut, then light flashes would express the immediate existence of light and diffusion of chaos.

After creating himself and his two children Re wept, and the tears that fell gave birth to mortal men and women.

Again, water droplets can be employed here expressing Re tears while the 3-D animation is demonstrating multiple men and women infront of the spectators' eyes.

In the meantime, Shu and Tefnut joined together as man and his wife and out of their union came Geb, the god of the earth, and Nut, the goddess of the sky. These two were locked in an embrace as they were born, and Shu had to come between them. He lifted Nut up into the area above the earth, and the universe, as the ancient Egyptians knew, was formed (Armour, 1986; Thomas, 2001). Nut more commonly has been shown as a woman or a cow sparkling with stars, arched over the body of her husband Geb.

At this part, strong air or wind effects and an upward motion of the seats can demonstrate Shu separating Geb and Nut from each other. Light effects as well can be used to show the sparkling stars while the 3-D movie is illustrating Nut.

Geb and Nut had five children born on the five epagnol days of the year. Osiris was born on the first day, Horus the elder on the second day, Seth on the third day, Isis on the fourth day and Nephthys on the fifth day.

Isis was the mistress of magic. She was the sister and wife of Osiris, and mother of the younger Horus. Nephthys was the sister and wife of Seth. (Seton-Williams, 1988).

When Osiris was born, there were many marvels, wonders and signs. At the time of his birth, Egypt was a barbarous country. Osiris became the king of a small state in the Delta, Busiris, and from there he moved to become king of all Egypt. He taught his people to cultivate the land and to plant grain, wheat and barely, to grow vines, to make laws and to abolish their savage customs.

Here3-D animation can play an important part demonstrating by the illusion of depth the spread of grains over land in front of the spectators' eyes .

His brother Seth hated Osiris, and while Osiris was away he gathered together seventy-two conspirators who planned to destroy Osiris. When Osiris returned they met him and invited him to a banquet where the prize was to be a splendid coffin, made to fit Osiris, although he did not know this. They held a great feast, and when it was over they invited all the guests to try the coffin for size. For one it was too small, for one it was too large; only when Osiris got into it did it fit perfectly. Then before he had time to get out, they nailed down the top, and poured molten lead into the cracks so that he should have no air to breathe. Thus died Osiris, and so he became ruler of the Dead and all who are in the West as The Egyptians regarded the Afterworld as being in the west.

The physical effect that can be used in this part is the base shaker of chairs giving the feeling of the movement of Osiris inside the coffin trying to get out.

The conspirators took the chest and placed it in the Nile where it was carried by the stream to the sea and then by currents up the coast to Byblos [near Beirut], where it landed by a tamarisk tree that grew on the shore.

The perfect physical effects for this part are motion effects up and down and swinging, in addition to wind and water drops or slight splashes to give the feeling of the coffin floating by currents in the sea, then a sudden stop of motion can demonstrate the landing of the coffin by the tree.

This tree grew tremendously, so that everyone wondered at its size and beauty so much so that the King of Byblos had it cut down and used it to

support the palace hall, not knowing that its branches were entwined around the coffin of Osiris.

Floral scent effects can give here the feeling of the beauty of the tree and light effects demonstrating shadows can express its hugeness.

Meanwhile in Egypt nobody knew what had happened to Osiris. Isis knew that something terrible had happened to her husband, and taking with her, her small son Horus, she fled to the Delta where she left her son with the Goddess Wadjet, the cobra-goddess of Lower Egypt, in the old city of Pe [Buto].

Leg tickling can be used here as a funny and exciting way for audience showing the cobra-goddess movement among them.

Wadjet took the child and placed him in the island of Chemmis so that he should be safe from Seth. Then Isis set out to look for the body of her husband, for she knew that the souls of men can not rest until the correct funeral rites are performed.

She wandered through the land of Egypt always asking the children if they had seen the coffin and they told her of the painted coffer that had floated down the Nile and out onto the Great Green Waters [the sea]. Isis came at last to Byblos where she met the maidens of the Queen of Byblos who came out to the Nahr al-Kalb to bathe and do the palace washing.

Again comes the role of water drops and slight splashes demonstrating the bathe and palace washing.

Isis had the chance to get into the palace as she offered to cure the young prince because she was a skilled healer. The Queen then offered Isis everything she possessed. Isis then asked the King and Queen to give her the pillar and what it contained; so men were brought, the pillar was taken down and split open and the coffin of Osiris revealed. Isis gave back the pillar to the people of Byblos, where it was worshipped for many years. She placed the coffin in a boat and returned to Egypt.

At this part, up and down and sway motion with Water droplets can demonstrate Isis returning trip to Egypt.

When she got back, she hid the coffin in the Delta under a bush while she went back to Pe to see how her son was getting on. She found that he had been bitten by a scorpion and had to wait until he had recovered. It was

thus some time before she returned to where she had left the body of Osiris.

In the meantime, while she had been away Seth had gone hunting in the marshes for wild boar. He saw the coffin glinting in the moonlight, tore out the body and ripped it into many pieces. Some say he divided the body into fourteen pieces, others into sixteen, and then he scattered the bits throughout the land of Egypt.

Sparkling light can be used here to illustrate the revealing of the coffin under the moonlight.

When Isis got back she found nothing but the broken coffin and she knew Seth was responsible for it, and she had to make her search all over again. She made a small boat of papyrus and sailed through the marshes and up the river in search of the pieces of the body.

Again water droplets and sway motion can be used to give the feeling of Isis sail in the river.

She knew that Seth must have not know what she found, or what she did with it. To confuse him, whenever she found a piece of the body she built a beautiful shrine and performed the funeral rites, pretending she buried it there. Really, she took the pieces with her, and by using her magic powers united the broken body into its old form.

Sound and light can be used here to give the effect of using magic to unit the Osiris body.

Whether she buried the whole body or only part of it at Abydos is uncertain, but Abydos traditionally became the god's resting place. Meanwhile, Osiris remains in the Afterworld, the Judge and Ruler of the Dead, until such time as he shall rise again and govern Egypt as before (Seton-Williams, 1988; Hart,1997).

And by this scene, the audience would reach the end of the story after being a part of it, living every detail with its characters for about 30 minutes.

The recommended museum for applying the 4-D movie theater system

Concerning the place of implementing the 4-D movie theater system, it is preferable to start applying this technology in a new museum with a sufficient space that would permit the installation of a movie theater in it, rather than planting a theater in a museum that already exists. The study

suggests starting applying this system in the Grand Egyptian Museum [GEM], which will be built 2 km from The Pyramids, as it will occupy a plot of land reaching approximately 117 feddans, about 480,000 square meters (Egyptian State Information Service, 2008; The Grand Egyptian Museum Technical Committee, 2008) hence, it is assumed that this museum could provide the required space for installing a 4-D theater in it. In addition, The GEM is still considered to be in its construction phase (The Grand Egyptian Museum Technical Committee, 2008), therefore, it is easier to add or specify in its designing plan a certain room or space to be a 4-D movie theater.

Conclusions and recommendations for future researches

This study has discussed the benefits of applying the 4-D movie theater systems in Egyptian museums as a method for enhancing and activating cultural tourism in Egypt. Previous practices of other educational and entertainment institutions worldwide concerning the adoption of these systems was proven to be successful with respect to the number of visitors received by these institutions , the presentation of the same 4-D shows in various locations worldwide for many years and the opinion of the members who are in charge in these institutions.

The present study suggested the application of the 4-D movie theater systems on ancient Egyptian legends and presented a hypothetical example or a model for how these systems and their physical effects can be applied on one of those legends as a way of innovating and remodeling the storytelling styles used in Egyptian museums. It has suggested as well starting to apply this technology in the Grand Egyptian Museum [GEM] as it is still in the construction phase, thus, it is easier to add or specify in its designing plan a certain room or space to be a 4-D movie theater.

As mentioned previously, the study represents a hypothetical model and will remain as such until it is tested empirically in future studies. It is recommended that future researches would start by conducting focus groups to investigate their opinions about applying the 4-D movie theater systems in the Egyptian museums. The second step would be the actual application of the 4-D movie theater system on the chosen legend in one of the Egyptian cultural museums, taking into consideration the ability to change the presentation through out the season or even during the operating day.

Future studies as well can discuss the application of other state-of-the art technologies involved with the development of museums exhibits such

as "dark rides" (king,1991: 5), "the interactive documentary presentation table" (Sparacino, 2004b: 4) and "the museum wearables" (Sparacino, 2004b: 5) since all of these technological applications can be used in Egyptian museum exhibits for taking forward steps towards achieving the "museum intelligence" concept (Sparacino 2004a: 1) and attaining the future museum that is able to delight its visitors and compete with entertainment institutions, returning to cultural tourism its importance and significance again.

References

Alcorn McBride (2009). Case study: 4D theater; Bellewaerde Park. Retrieved March 24, 2009, from: http://www.alcorn.com/cases/bellewaerde/index.html.

Alfaro, I., Nardon, M., Pianesi, F., Stock, O. & Zancanaro, M.(2004). Using cinematic techniques on mobile devices for cultural tourism. In Frew (eds.), *Information and communication technologies in tourism*, pp.39-48. New York, Springerwien.

Armour, R.(1986). *Gods and myths of Ancient Egypt*. The American University in Cairo Press, Cairo & New York.

Baron, R.(1995). On national myths in museums and theme parks: why people go to museums. Retrieved July 15, 2008, from: http://www.studiolo.org/Email/DISNEY01.htm.

Becker, S. (2008). 3-D movies are back, and better than ever. *The Dallas Morning News. Pittsburgh tribune review*. Retrieved August 8, 2008, from: http://www.pittsburghlive.com/x/pittsburghtrib/living/s_577196.html.

Bibliotheca Alexandrina (2009).Planetarium Science center. Retrieved March 27, 2009, from: http://www.bibalex.org/psc/planetarium/overview.aspx.

Brandel, S.(2006). *4-D objects for animation: an immersion of virtual reality*. Universite Louis Pasteur, Strasbourg.

Calvache, P. (2008). *Stereo 3D technologies in computing, entertainment and art: a reminder of today and a look at tomorrow*. University of Applied Arts,Vienna.

Canadian Heritage (2006). Cultural-Heritage Tourism: Review of existing market research definition of Culture/Heritage Tourism. Canada. Retrieved November 17, 2008, from: http://www.pch.gc.ca/pc-ch/pubs/tourism/documents/2006-05/4_e.cfm.

Clatworthy, K. (2008). 3D cinema the next big thing. Retrieved November 4, 2008, from: http://www.viewmaster.co.uk/htm/3dcinema.asp.

Coinline (2007). 3D / 4D Cinema. Coinline Inc. Retrieved August 4,2008, from: http://www.coinline.net/dynamic2007 ?action=tuote&tuotesivu=60.

Davenport, G., Sparacino, F.& Pentland, A. (2000). Media in performance: interactive spaces for dance, theater, circus, and museum exhibits. *IBM system journal*, 39, 479-510.

Egyptian State Information Service (2008). The Grand Egyptian Museum. Retrieved November 21, 2008, from: http://www.sis.gov.eg/En/Arts&Culture/Museums/GeneralMuseums/070301000000000008.htm.

Eternal Egypt (2008a). Goddesses of ancient Egypt. Retrieved December 16, 2008, from:http://www.eternalegypt.org/EternalEgyptWebsiteWeb Home Servlet?ee_website_action_key=action.display.module&story_id=&language_id=1&module_id=169.

Eternal Egypt (2008b). The myth of Isis and Osiris. Retrieved December 12, 2008, from: http://www.eternalegypt.org/EternalEgyptWebsiteWeb Home Servlet?ee_website_action_key=action.display.module&story_id=&language_id=1&module_id=181.

Eternal Egypt (2008c). The legend of Isis and Osiris. Retrieved December 12, 2008, from:http://www.eternalegypt.org/EternalEgyptWebsiteWeb/Home Servlet?ee_website_action_key=action.display.module&story_id=&language_id=1&module_id=275.

Eusebeîa organization (2008). 4D Visualization. Retrieved November 10, 2008, from: http://eusebeia.dyndns.org/4d/vis/01-intro.html#Introduction.

Goldstein, H. (2001). 4D: Science Fiction or Virtually Reality? McGraw-Hill. Retrieved August 30, 2008, from: http://construction.com/NewsCenter/it/archive/01-20010416pf.asp.

Hart, G.(1997). *Egyptian myths; the legendary past*. University of Texas Press, Austin. [20] IMAX (2008). The IMAX experience. Retrieved September 12, 2008, from: http://www.imax.com.au/visitor_info/about.asp.

King, M.(1991).The theme park experience; what museums can learn from Mickey Mouse. Retrieved August 1, 2008, from: http://www.allbusiness.com/professional-scientific/scientific-research/264418-1.html.

Lee, D. (2001). Let's get physical. Maxon Dynamics. Retrieved November 9, 2008, from:http://www.maxon.net/pages/dyn_files/dyn_htx/htx/69/00069_00070.htmlmq.

Majo, J., marrtinez, J., & Vazques, P.(2004). Virtual museums: new added-value for museums websites. In Frew (eds.), *Information and communication technologies in tourism*, pp.195-204 . New York, Springerwien.

MediaMation (2008). X4D™ special effects 3D/4D theater general information. MediaMation Inc., CA.

Messner,J., Yerrapathruni, S., Baratta, A. & Whisker, V.(2003).*Using Virtual Reality to Improve Construction Engineering Education*. The Pennsylvania State University: American Society for Engineering Education.

Metropolis Entertainment (2008). 3D/4D Effects Seat Theatres. Retrieved August 16, 2008, from: http://www.metropolisav.com/metropolis/entertainment/3D4DTheatres/ default.asp.

Mirski, P. & Abfalter, D.(2004). Knowledge enhancement on site-guests' attitudes towards M-learning. . In Frew (Eds.), *Information and communication technologies in tourism* , pp.592-600. New York, Springerwien.

MotionBase (2008). 4D motion theater seats. Australia. Retrieved August 7, 2008, from: www.motiontheaterseats.com.

National Assembly of State Art Agencies (2008). Cultural Tourism defined. Retrieved November 12, 2008, from: http://www.nasaa-arts.org/artworks/cultour.shtml.

Noah's Ark Dive-In Theater (2007). Noah's Ark's newest ride-in drive-in theater; SpongeBob Squarepants: movie to premiere in 2007 season. Retrieved March 26, 2009, from: www.noahsarkwaterpark.com.

Philips Electronics (2008). Philips 3D Solutions Technology Backgrounder WOWvx for amazing viewing experiences. Philips Electronics B.V., Nederland.

Real D (2008). How does RealD 3D work. Retrieved October 19, 2008, from: http://www.reald.com/index.php/pages/what_is_reald.

Reid, M.(2008).The theater in the museum: A look at recent installations. Iconpath corp.

Sentosa (2008). Sentosa 4D Magix. Retrieved March 23, 2009, from: http://www.newasia-singapore.com/places_to_go/themed_and_other_attraction/sentosa_4d_magix_20070816593.html.

Sentosa Island (2008). Sentosa 4D Magix- Singapore. Retrieved March 23, 2009, from:http://www.sentosa.com.sg/explore_sentosa/attractions/sentosa_4dmagix.html.

Seton-Williams, M.(1988).*Egyptian legends and stories*. Rubicon Press, London.

Sparacino, F.(2004a). Museum intelligence: using interactive technologies for effective communication and storytelling in Puccini Set Designer Exhibit. France: French Ministry of Culture and Communication.

Sparacino, F.(2004b). *Scenographies of the past and museums of the future: From the Wunderkammer to body-driven interactive narrative spaces*. USA: ACM Multimedia.

StarTrek (2004). New simulation attraction: Borg Invasion 4D. StarTrek.com. Retrieved November 20, 2008, from: http://www.temple.edu/ispr/examples/ex04_01_14.html.

The Grand Egyptian Museum Technical Committee (2008). The Grand Egyptian Museum. Egypt: Ministry Of Culture. Retrieved November 25, 2008, from: http://www.gem.gov.eg/main.htm.

The Health Museum (2008). Nation's Only Health Museum Reopens McGovern Theater to offer science in 4D. Houston: The Health museum. Healthcare Services media Retrieved March 26, 2009, from: www.duedee.com.

The National Centre for Culture and Recreation Statistics of the Australian Bureau of Statistics (2001). *Cultural tourism statistics*. Australia: Cultural Ministers Council.

Thomas, A.(2001). *Egyptian gods and myths*. Shire Pubns., Buckingham.

Turnkey (2008). Turnkey Service of YAOX. YAOX Edutainment Co., Ltd. Retrieved August 6, 2008, from: http://www.yaox.com/turnkey/e-TotalSolution.html.

Universal Studios (2009). Shrek 4-D. Retrieved March 24, 2009, from: http://www. Universalorlando.com.

Walt Disney world (2009). It's Tough to be a Bug! ; Attraction at Disney's Animal Kingdom Theme Park . Retrieved March, 23, 2009, from: http://disneyworld. disney.go.com/ parks/animal-kingdom/attractions/its-tough-to-be-a-bug/.

Wilkes, N. & Krampf, J. (2007). Noah's ark's newest ride makes waves in 4-D drive-in theater. Retrieved October 21, 2008, from: www.noahsarkwaterpark.com.

Yardeni, A. (2008). 4D Smart Chairs. Simnoa Technologies. Retrieved October 16, 2008, from: http://www.simnoa.com/products.htm. 3D Review (2008). Seeing Double Since 1850 information. *3D Review online magazine*. Retrieved August 4, 2008, from: http://www.3-dreview.com.