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Museum Collection Management in the Past, Nowadays and in the Future (Grand Egyptian Museum "Case Study")

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Abstract:

My aim in this research is to contribute to put a long-term strategy plan for successful collection management in museums by implementing modern technology in museums stores and highlighted how museum collection was managed in the past and nowadays and the proposed successful collection management in the future in Egypt and all over the world. Researcher focused on the importance of the inventory in museums and its relation with museum documentation, registration and museum publication. Museum ethics, Museum Inventory in Egyptian Antiquities Protection Law. History of Digitization in the International museums, implementing of new technology in collection management at museums, the meaning of QR CODE Technology, how museums will benefit from this technology, and the methods of implementing it.

Modern technology will help museum to manage its collection perfectly according to museum documentation, registration and museum inventory.

Key Words:

Museum- Grand Egyptian Museum- Museum Digitization

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Introduction:

The museum is legally responsible and ethically obligated for Preserve and protect its artifacts by planning a powerful strategy plan for its collection management to lead museums towards better performance in terms of sustainability and maintenance museum social role about preservation of collections and its value with keeping it safe as possible. Inventory process is very important in museum. Taking good care of all artifacts at the museum holds in public trust for now and future generations. Therefore, museums should use what can be used and benefit from modern technology in stores because store rooms are a hidden treasure for museums.

relatively cheap medium of QR codes could be an appropriate way to better reorganize museum stores Is it possible for museums to use modern technology in museums stores not only used in museum exhibition.

The research will respond for some questions, how museums were managing their collection in the past, and how museum managing the collection today, what are the proposed plans for future management of museum collection in the future.

What are the advantage and disadvantages of using modern technology in collection management in museums? And the relation between museum registration, museum documentation and museum inventory.

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Importance of research:

The significance of the research is considered as one of the first to discuss the importance of museum collection management, and its relation with museum documentation, museum registration and museum inventory.

The research also discusses the methods of managing museum collection perfectly according to museum registration, documentation, inventory and relates them with museum objects publication also using modern technology in museum inventory in the international museums. And implementing modern technology in Grand Egyptian Museum as case study, using QR CODE in museum stores for a museum collection management describes how museums manage and care for their collections to meet standards and legislation relating to museums and collections.

This includes the antiquities protection laws, safeguarding the preservation of the collections through appropriate conservation, handling, storage and display methods.

Problems of the research:

The problem of this Study and its Most Important Hypotheses:

This research discussing some main questions during the work which is what, why, and how:

- What does the term "Museum collection management "means?
- Why the museums need to put a policy for its collection?
- How were the museums managing its collection in the past?

And what is the proposed action plans for museum collection management in the future?

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Definitions of the museum and it's roles:

The term museum as we know, has classical origins in its Greek form, "mouse ion", it meant seat of the Muses‖ and designated a philosophical institution or a place of contemplation.

Investigation of the development of museums from ancient Greek to the 20 Century shows the museum has progressed from merely exhibition collection to being the centers for learning and research as informal education areas and tools for communicating the mass culture.

Recently the definition of a museum is still followed its form their meeting in 1955 defined museums which had been agreed during the 22nd General assembly of ICOM in Vienna on 24 August 2007, which reads:

A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates, and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment. (An Essay,1830).

Are not for profit. They are participatory and transparent, and work in active partnership with and for diverse communities to collect, preserve, research, interpret, exhibit, and enhance understandings of the world, aiming to contribute to human dignity and social justice, global eq Museum ethics:

• The ICOM Code of Ethics for Museums sets minimum professional standards and encourages the recognition of values shared by the international museum community, this reference tool provides guidance and is presented as a series of principles supported by guidelines detailing expected professional practice. It was drafted in a cross-cutting manner and conceived as an instrument of professional self-control. ICOM members must accept and comply with the Code's rules. (https://icom.museum/en).

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• Ethics is a means for formulating institutional and professional order and influencing both individual and group conduct. Ethical thinking in the 21st century is more complex and but is interested in many types of ethical issues.

• Ethics for the museum professional is about value judgments and the process of decision-making, as well as doing the right thing, ethics considers the theoretical and practical elements of the philosophy of conduct in relation to critical contemporary issues and museums. This assessment includes the acquisition of artifacts, and the storing of objects. (Abdel- Meguid 2020).

• As for the ICOM Code of Ethics for Museums, it provides that: "Museum collections should be documented according to accepted professional standards. Such documentation should include a full identification and description of each item, its associations, provenance, condition, treatment and present location. Such data should be kept in a secure environment and be supported by retrieval systems providing access to the information by the museum personnel and other legitimate users." (art. 2.20). quality, and planetary wellbeing". (ICOM,2021) is every two years and completed within a period Max 6 months.

What is the relation between Museum documentation and museum collection inventory?

- Good documentation can facilitate the efforts of the museum to retrieve stolen objects. For example, in the aftermath of the looting and vandalism of the museum on 28January 2011, 58 objects were found in tahrir museum were stolen. However, thanks to their proper documentation, the museum together with the police and Interpol were able to retrieve these objects. The museum has thus far succeeded in retrieving 39 of the 58 stolen objects, notably JdE 67925 (SR.3/8944), a bronze statue of Harpo crates dated to the 26th Dynasty, gifted by King Fouad I in 1936. In addition, PV.2009.4, PV.2009.5,

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- PV.2009.6, PV.2009.7, and PV.2009.8, five painted limestone relief fragments cut and stolen from the tomb of Seti I (KV17), were returned to Egypt by the University of Tubingen in 2006, thanks to published photographs of the tomb from the 1920s (Gamal rashed,2019)

- Documentation is the process of recording information about the collections for which a museum or cultural institution is responsible. Objects should be documented consistently using recognized standards. These have been developed by national and international organizations, including ICOM and UNESCO.

- Having an accurate and detailed description of all museum objects in case it is lost or stolen is very important process. It will also help you to recognize it and distinguish it from other similar objects if found.1 Documentation can be defined as a process of recording and documenting the inventories in a certain museum or certain cultural institution. The acquisitions must be documented on an ongoing basis according to the generally accepted standards. These standards have been updated and redeveloped by national and international organizations, namely, the UNESCO and the international museums council. So, proper and correct documentation of acquisitions in museums. The perfect inventory very related with documentation and registration in any museum: The ICOM Code of Ethics also includes provisions regarding the documentation of collections, in its article 2.20: "Museum collections should be documented according to accepted professional standards. Such documentation should include a full identification and description of each object, its associations, provenance, condition, treatment and present location. Such data should be kept in a secure environment and be supported by retrieval systems providing access to the information by the museum personnel and other legitimate users".

- Documentation contains data concerning the physical characteristics of the object (dimensions, shape, material, etc.), its full history.

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Strategy plan for museum collection management:

Strategy plan help us to know where our museum is today, and where it wants to go in the future. A strategic plan helps us to communicate your aims and objectives. Collection storage project success is determined by alignment with larger strategic goals. Those planned as collections growth, access and preservation projects succeed while those approached as a building project fail. The resources required for each are completely different and impact the project definition in early planning, the internal consensus required and the financial resources needed (for the project and future operations). So museum collection management must set a long term strategy plan to achieve it containing rules for museum inventory depending on museum policy, Egyptian laws and ICOM ethics.

Definition of Digitization Development:

What is digitization development, what is meant by it, and how can it be defined? These are the questions that come to the mind of everyone who hears the term digitization development and is acquainted with it for the first time. In the coming lines, we will simply explain the meaning of the term digitization development in museums and shade light on the history of the digitization in the world and QR technique as important type of it and its role in museum collection management.

The digitization of a museum can be defined as a three-fold process: the incorporation of digital tools in the museum's work methods, the creation of digital versions of its objects and object-related information, and finally the creation of a presence on the Internet (and through other digital modes of communication such as apps) that potentially might evolve into a full-scale digital equivalent of (if not a substitute for) the museum. In general, digitization involves the application of digital tools (e.g. computers, databases, networks).

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Digital technology has underpinned new forms of work, new relationships with users, new modes of access, and new definitions of key concepts such as objects, collections and the museum itself. To date, however, a national perspective to describe and explain the process of digitization in museums is missing). Computers have been used in Archaeology as early as 1958, (Cameron Fiona Ruth, 2007).

Needless to say, computer technology in both hardware and software has drastically changed since the late 1950's, with today's era definitely a "Digital Era". Computers and other computing devices (Smartphones included) have become an integral part of our lives and infiltrating all disciplines, becoming a standard and indispensable tool. With the current rate of development in computer technology, we can expect more adoption of digital technology in our lifestyles with smaller and more intelligent devices that are becoming an essential and indispensable part of our daily activities and professional careers. Today, computers are used extensively in Archaeology for the Recording, Archiving, Analysis, Visualization.

Presentation and Publication of Archaeological data. Simply put, and to use computer jargon, this is simply "Data Processing" of the available amount of knowledge we acquire for a certain topic, something which computers have been designed to do. The use of computers in all steps of the Archaeological processes, whether in digs or in later studies, analysis, reconstructions and in academia, has become the trend, greatly changing the manual workflow and creating a new methodology for all aspects of the practice and study of Archaeology. (Tsiafaki & Michailidou, 2015).

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The Importance of Museum Digitization:

In the Digital Era, digitizing museum objects is a top concern. Digitization now supports and enhances all aspects of the work museums do, even if the technology was initially perceived as a contradiction for cultural institutions that revolve around their physical collections. Though we mostly think of digitization in relation to online exhibitions, digital technology has become essential in the overall management of collections.

Museums increasingly connect all the information related to the objects in a digital repository, including images, history of the object, conservation reports, exhibition texts, related publications, and physical location of the objects using a form of barcode. Creating such repository of information increases efficiency in the work-flow; in effect it substitutes 'capital', that is data processes, for labor. Once created, museums can easily reposition selected content to the Internet allowing remote access to information about the collections. Digitization hence represents the adoption of anew working form supported by a technology that allows museums to participate in the information economy.

It also represents a significant investment. Aside from the machinery and training of staff, the greater cost remains the migration of all the collection's information into an up-to-date content management system. The digital dissemination of collections online represents hence only one aspect of the digitization work in museums, the impact of technology on traditional museum collection storage was the primary task looked into in this research. As we have mentioned, Museum as a repository of artefacts needs to be well planned for and managed to sustain the preservation and conservation of the heritage in its care for the overall achievement of the museum agenda. The traditional role of museum is to collect objects and materials of cultural, religious and historical importance, preserve them, research into them and present them to the public for the purpose of education and enjoyment. But this comes with challenges.

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These challenges through the different views on museum were taken into consideration for the application of digital storage media in museum collection storage, and this led to the aspect of technology that was presented in this paper. However, digital storage media application in museum collection storage can only facilitate storage of, and easy access to electronic data, it does not provide long-term archival storage. Therefore, technological museum for the virtual preservation and conservation of museum collections was introduced but not explicitly. Research work on technological museum development and implementation as alternative to long-term archival storage of museum collections for the overall realization of the goals and objectives of museum is recommended. Egypt signed the 1970 UNESCO Convention in 1973.

The Evaluation of Digital Technology in museum Collection management:

"Discussions of technology must start with who we are and who we want to be as museums and as museum professionals within the context of our disciplines, communities, cultures, and countries" (Morrissey & Worts 1998, pp. 148).

Over the past century, museums have tremendously evolved in regards to the collections they maintain, the exhibits that have been placed on display, and the methods in which information is disseminated to visitors of the institution.

Within the last decade of the 21st Century alone, technological advancements in the museum have not only allowed visitors to learn more information about exhibitions they are seeing through the use of computer kiosks and audio guides, but technology has also assisted museum staff in their everyday duties.

"Technology is more than a tool, it is an extension of the staff, it serves a key component in the larger organizational mission" (Spinazze 2007, pp 131) demonstrating the importance and impact of technologies in our everyday lives.

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The inexorable loss of Egypt's cultural heritage is not only a concern of those who deal with the issues every day, but a concern of the world. Priceless ancient Egyptian artifacts are disintegrating at an alarming rate, and it is up to us to help prevent this.

Many institutions have started on their journey towards incorporating digital technologies because "new technologies continue to reshape our approaches" (Daigle 2012, pg. 245) in regards to audience outreach and the amount of information that can be disseminated worldwide.

" Digital technology provides an amazing opportunity for museums by allowing them to be ubiquitous, exist in a variety of forms that correspond to the needs of different visitors, engage with new audiences, and, above all, forge relationships that are far more meaningful than traditional museum visits" (Alfandari, Agnès,2014).

Ensuring that cultural heritage resources are available online, can increase tourism and contribute to the economy. These resources are significant forces in shaping societal development in Egypt. Making historical memory that can be accessible to all and by promoting cultural experiences, appreciation and understanding, the value of the preservation of the culture, both ancient and modern can be appreciated by all.

"Establishing history websites, digital libraries, or a historical memory for each country on the Internet is a new method with various positive advantages. It copes with [people's] attempts to form their culture and knowledge through digital media, and not the previously used forms of transmitting knowledge and science. The variety of historical sources and materials also makes the Internet a perfect method to connect materials together" (Azab 2016, pg. 8).

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Beginning of Digitization in The Egyptian Museums:

The Egyptian Museum Cairo has been around for more than one hundred years, and is one of the most famous landmarks in the heart of Cairo's Tahir Square. Home to the world's largest Egyptology collection of Pharaonic art, the museum was built to showcase its cultural heritage and attract visitors from all over the world.

Early in Egypt's history, the ability to keep ancient Egyptian antiquities safe from danger was a problem, like it is today.

But un fortunately the EMC is that neither a mission statement nor vision statement has been developed for the institution. Despite the fact that the museum has been very successful, the lack of these statements can greatly impact the connection a visitor might have with the museum since it does not know what it officially stands for.

Although neither a mission statement nor vision statement has been established, the EMC has strived to be its best despite multiple hindrances that have arisen throughout its history. For instance, over multiple decades, the façade of the museum has deteriorated significantly due to inadequate maintenance of the building. In addition to this, the city's pollution and traffic problems have also contributed to the museum's exterior decline.

Prior to 2007 (and pre-revolution), the EMC did not have a Registration Department, avital and crucial department to any museum. Because of this, Dr. Scott Getty, the American Research Center in Egypt's (ARCE) director established The Egyptian Museum Registrar Training Project (EMRTP) which would "hire and train registrars to keep track of and care for the Museum's vast collection" was made possible with funding from "ARCE's Egyptian Antiquities Conservation Project (EAC) which was possible through a grant from the United States Agency for International Development (USAID)"

(ARCE 2011/2012, n.d.).

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Goals of the Egyptian Museum Registrar Training Project were twofold and were worked on in conjunction with Egypt's Supreme Council of Antiquities:

• To teach a select group of newly hired registrars the policies, practices and skills needed to manage the Museum's collections including day-to-day activities of acquisition, cataloging, tracking object movement and location, condition reporting, object handling, inventory, preventive care, loans, and appropriate documentation.

• To develop and maintain a computerized collections management system in order to effectively track the Museum's collection" (ARCE 2011/2012, n.d.).

• Digitization projects initiated and supported by ARCE's.

Antiquities Endowment Fund (AEF) In Egypt:

Two digitization projects were initiated and supported by ARCE's Antiquities Endowment Fund (AEF).

The first project took place from July 2005 through August 2006, which "digitized all of the museum's Journal entrée and Temporary Register books, a total of thirty-six volumes" (Kamrin 2015, pg. 432).

What is so special about the Journal d'entrée books is that they are all handwritten, and there is only one of each volume making them unique and irreplaceable (Kamrin 2007; ARCE 2011/2012, n.d.). These books are essentially every Egyptologists bible and first step toward finding out information about an object in the EMC's collection, making it an invaluable resource to be digitized. Many of these books show heavy signs of wear and tear as a result of being frequently used by scholars and curatorial staff (not to mention that some of the volumes are over a century old) (Kamrin 2015, pg. 432).

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Because the books are in a constant state of deterioration, and fear if there was ever a disaster such as a fire or flood, the EMC decided it was best to get these materials digitized so their contents would not be lost forever.

"After each page had been digitized (at full-size, 300 dpi) and processed in Adobe Photoshop (an image processing program), it was saved as a TIFF file and also laid out for printing in an Adobe InDesign file" and in addition to this "a lower resolution (150 dpi) copy of each spread was saved as a JPEG file and linked to the database for ease of reference" (Kamrin 2015, pg. 432).

The second project ran from July 2007 through December 2008, focusing on the digitization of the EMC's 98 Special Registers. These registers were created in the 1950s in which a majority of objects on the upper floors of the EMC were assigned to one of seven "sections" that correspond more or less to chronological periods or categories of objects which are also tied to the galleries in which the objects are displayed or stored (ARCE 2011/2012, n.d.; Kamrin 2015, pg. 392).

In addition to the registers, multiple Catalogue general des antiquities égyptiennes du Musée du Caire (CG) manuscripts and printed volumes were digitized. These manuscripts are important as they also "group and number objects according to category (e.g. statuary, obelisks, Canopic jars, etc.) or assemblages" (ARCE 2011/2012, n.d.) which is another reference guide for Egyptologists and scholars who are looking for more information on particular objects.

The Egyptian Museum Registrar Trained on project (EMRTP) &collections management Process so The EMRTP trained nine registrars who "oversee all aspects of the centralized collections management and documentation systems within the museum" (Kamrin 2015, pg. 433).

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Regarding the Collection Management Process at the EMC, the following principal duties are overseen and managed by the RCMDD: accessioning, inventory, movement tracking, in-house exhibitions, travelling loans and outside requests (Kamrin 2015, pg. 434). All of these duties ensure the database stays up-to-date and contains pertinent information that can be useful for both staff and scholars.

Another result from the projects is the creation of intranet and internet portals. The intranet portal is only available to museum staff. It includes all of the objects and collections management information in the database that has been published along with images and facsimiles, while the internet site which would accessible to the public (containing selected materials approved by Egypt's Supreme Council of Antiquities), has not been published due to the fact that the "internet connection at the museum is still not able to carry the expected load, so the site has not yet been launched" (Kamrin 2015, pg. 435).

With the development of the internet and the creation of websites, museums were able to take steps and develop methods in regards to how they wanted to reach new audiences by taking their collections outside of their physical walls. Alfandari in her article, how digital can help museums to reach new audiences (2014) raises a good point when she states:

"Although websites are wonderful tools for meeting visitors and amateur's needs, they are of relatively little help in reaching new audiences So how can a museum reach people who are not yet interested in museums or who know of us but feel uncomfortable with the institutional site?"

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History of Digitization in the International museums:

In general, digitization involves the application of digital tools (e.g., computers, databases, networks). More specifically, the digitization of a museum can be defined as a three-fold process: the incorporation of digital tools in the museum's work methods, the creation of digital versions of its objects and object-related information, and finally the creation of a presence on the Internet (and through other digital modes of communication such as apps) that potentially might evolve into a full-scale digital equivalent of (if not a substitute for) the museum.

- Digital technology has underpinned new forms of work, new relationships with users, new modes of access, and new definitions of key concepts such as objects, collections and the museum itself. To date, however, a national perspective to describe and explain the process of digitization in museums is missing).

- The Dutch experience with MusIP (Museum Inventory Project) of the early 2000s, where initially collected data showed backlogs in both analogue and digital documentation, Navarrete also mentioned the fast conversion of paper documents into digital form (scanning information cards and hiring external typing services). Navarrete points out that through newly available techniques (scanning), more and more old documentation was digitized (Navarrete Hernán- dez, 2014).

Collections or Content Management Software (CMS):

Is the software used by collections staff to track all information related to and about collections objects? Primarily in this research, I am referring to software specifically designed to work with museum collections and not database software such as Microsoft Access or FileMaker Pro (although both are widely used by museums today for tracking collection information). However, when discussing the early evolution of CMS, I refer to software that is very basic in function and often did less than the database software available today.

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A database is the underlying programming used by CMS to store information. It holds the raw data that is put into it. Database software can take the raw data stored in the database and present it in a readable form. This differs from CMS in that CMS can take its database and organize it in a readable form that is more immediately useful to museum staff. Database software must be specially programmed to attain that same level of functionality.

Digitization refers to putting collections information such as media, artist, or donor records into a computer. This was the historical use of the term, but owing to the majority of museum records now being on the computer.

Implementing of Modern Technology in Collection Management at museums:

The collection resides at the core of any museum's work, Museums can use various modern technologies in order to raise their market competitiveness. Technological innovation allows museums to become more attractive and fulfil their functions better while also using their resources more efficiently. The first part of this paper presents a series of technological innovations specific to museums and the way in which these innovations can lead to an increased museum performance. Through technology, museums can manage their collections better, offer unforgettable experiences to their visitors and exceed their physical limits by using online distribution and communication channels Parry, R. (Ed.) Museums in a digital age. Routledge, (2013).

Computers have supported the management of collections since the 1960s, however, these systems have evolved in sophistication since the 1980s and 90s (Canadian Heritage Information Network, CHIN,2008).

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These systems are often the backbone of the museum. Delphine Bishop, of the National Gallery of Canada, noted that almost all museum departments use the collection management system, and each contributes information about a particular object. Many interviewees also noted that museum professionals must have a good understanding of how collections are maintained and managed, and how information about these objects is recorded in a collections management system (CMS).

The meaning of QR CODE Technology:

A QR code is a type of barcode that can hold more information than the familiar kind scanned at checkouts around the country. The "QR" stands for "quick response," a reference to the speed at which the large amounts of information they contain can be decoded by scanners. They were invented in 1994 in Japan and initially used for tracking shipping.

As the code can be easily decoded by the camera of a BlackBerry, iPhone or other smartphone, this technology is increasingly accessible to the average person. Instead of tracking car parts and packages, the codes can work with the phone's Internet browser to direct the visitor to online content quickly and efficiently. A QR code acts as a link embedded in the real world, integrating it with the virtual computer world. Currently they are being widely used for advertising campaigns, linking to company websites, contest sign-up pages and online menus.

A QR code (an initialize for quick response code) is a type of matrix barcode (or two-dimensional barcode), invented in 1994 by the Japanese automotive company Denso Wave. A barcode is a machine-readable optical label that can contain information about the item to which it is attached. In practice, QR codes often contain data for a locator, identifier, or tracker that points to a website or application, A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to store data efficiently; extensions may also be used. (NHK World-Japan,26 March 2020).

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The Quick Response system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing. (Denso ADC. 2011).

The easiest way to "read" a QR code is by scanning with the camera of a smartphone. The operation is performed with an application which is able to interpret the QR code. It may contain web addresses, names and addresses, phone numbers, email addresses or other information, and the phone's browser directs the user to the URL in question Applications of QR codes range from commercial tracking, transport and entertainment ticketing, visa and passport information, delivering of Wikipedia articles (QR pedia), songs downloading, to encrypted government data (Denso Wave Incorporated ,2013).

The easiest way to "read" a QR code is by scanning with the camera of a smartphone. The operation is performed with an application which is able to interpret the QR code. It may contain web addresses, names and addresses, phone numbers, email addresses or other information, and the phone's browser directs the user to the URL in question Applications of QR codes range from commercial tracking, transport and entertainment ticketing, visa and passport information, delivering of Wikipedia articles (QR pedia), songs downloading, to encrypted government data (Denso Wave Incorporated 2013). QR codes have gained international standardization and standardization of the Japanese form of ISO/IEC18004 and JIS- X-0510. QR codes are also being implemented in libraries in different ways (Ashford ,2010).

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Computers have supported the management of collections since the 1960s, however, these systems have evolved in sophistication since the 1980s and 90s (Bearman 2008). These systems are often the backbone of the museum. Delphine Bishop, of the National Gallery of Canada, noted that almost all museum departments use the collection management system, and each contributes information about a particular object. Many interviewees also noted that museum professionals must have a good understanding of how collections are maintained and managed, and how information about these objects is recorded in a collections management system (CMS).

Automatic Identification and Data Capture (AIDC) methods in museum collection management:

This new method for labelling significantly enhances collection management, enabling more information to be recorded than any other method on very small labels (from 1.5 cm) that can be read by a mobile smartphone.

- QR labels have already been used in museums for displayed specimens, but it is shown here that they also have value in the management of reference collections, research, and loans.

- Museums typically record information about individual specimens on labels that accompany the specimens. These labels are normally standardized in size and for- mat according to the specific museum, department, or section.

- As levels of documentation increase with time, and specimens have more associated information, it becomes impossible to fit everything on a small label. For this reason, Automatic Identification and Data Capture (AIDC) methods have been introduced and are expanding in museums. AIDC not only saves space, but uses labels that are economical to generate. Cultural Heritage institutions, such as museums of all kinds and art galleries, can take advantage of this new technology. In the words of Dahlström et al. (2012, 455).

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- " Digitization of cultural heritage brings new practices, tools, and arenas that reconfigure and reinterpret not only the collections, but the memory institutions themselves as well as the roles they respectively play on a societal level". A digitization strategy can be applied at two levels: mass digitization (every specimen) and critical digitization (e.g., only displayed specimens) (A Journal for Museum and Archives Professionals, 2013, pp. 239–254). "With people's awareness in using QR codes today, curators integrate the use of QR codes in museums and art pieces in wirelessly relaying information to them.

- QR codes provide a bridge between the digital and the physical world by delivering content to the most used electronic devices.

- QR labels are tools capable of providing museum staff alike with rapid and easy access to information about specimens of interest.

- Labels can be customized and branded with a logo and/or corporate colors. Furthermore, they can be used to monitor the status and track the condition of specimens in the context of conservation and museum loans.

- QR Code tags are potentially the most useful labels available for museum collection management. They combine the characteristics (Chuang Jun-Chou et al., 2010, 468) of their two bar code predecessors (PDF417; Data Matrix; and MAXI Code), specifically:

- High data capacity more than 7000 characters for numeric data, and more than 4000 characters for alphanumeric data)

- High density recording with small printout size (information is stored both vertically and horizontally).

•High speed scanning (using a mobile smartphone with camera).

•Resistance to distorted symbols, with alignment patterns arranged in regular intervals within the range of the symbol (Rouillard, 2008).

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•Easy data restoration functionality with four deferent error correction levels (Low: with maximum 7% restored; Medium: with maximum of 15%restored, Quartile: with a maximum of 25% restored; and High: with a maxi- mum of 30% restored) (Chu et al., 2007)

QR Code Technology for Centralized Inventory management system in Museums:

The use of QR labels can greatly improve the amount of this information available to curators, researchers and/or visitors. These labels take up very little space, which is important for museums in the twenty-first century with limited storage.

Museums typically record information about individual specimens on labels that accompany the specimens. Labels are normally standardized in size and format according to the museum, department, or section. As levels of documentation increase with time, and specimens have more associated information, it becomes impossible to it everything on a small label. For this reason, Automatic Identification and Data Capture (AIDC) methods have been introduced and are expanding in museums. AIDC not only saves space, but uses labels that are economical to generate.

In the words of Dahlström et al. (2012, P 455): “Digitization of cultural heritage brings new practices, tools, reinterpret not only the collections, but the memory institutions themselves as well as the roles they respectively play on a societal level”.

A digitization strategy can be applied at two levels: mass digitization (every specimen) and critical digitization (e.g.,only displayed specimens).

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Results:

This study aims to mentioned how were museums manage their collection in the past, what is the proposed collection management in the future and also present the current challenges in museum collection management in GEM. Highlighting the importance of reorganizing museum stores by implementing QR-code technology for managing museum collection successfully and conducting an accurate inventory for museum stores.

Because if a museum can't manage its collection in storage successfully, it will invite theft because it will have no immediate sense that an object has disappeared, and most important, it will have no descriptive information to aid the recovery of an object in the event of a theft Moreover, the existence of such information is essential to understand the history of an object and to clearly establish its ownership.

So along-term strategic plan must be managed the collection by implementing of QR-CODE inventory system on for some reasons:

QR-CODE inventory system supports a museum in accountability it's objects as follows, knowing numbers of objects that a museum holds in its possession.

Implementing QR-code inventory system is very important not only for museum collection management but also for curators because it enables them for accounting and checking its objects and will be able to review it very easily facilitates his daily work inside the store.

So QR-code inventory system will help the store head in quick inventories and accounting total numbers of the recorded objects at the risk time in store.

Quick access for the authorized users and researchers to all data are concerning of the objects like as: paper, digital, or media documentation or all of them.

Helps to find object in collections quickly when they are needed.

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Increasing the object values and Provided Us Historical Archive and information for each object and collections which helps a museum to manage its collections for a long time.

Decreasing handling of the objects for protect the objects from any damage may be occur during the manual inventory.

Preserving museums archaeological paper registration because of its importance, it must be treated as an artifact. Such as paper registration of Khufu solar boat which is written by Ahmed Youssef one of the greatest conservators in the humanity who documents Khufu solar boat in this paper registration.

Conducting accurate inventory by implementing QR-code on every object improve collection management and object research:

- Marketing objects
- Promotion.
- Publications.
- Production Multimedia (documentary films, virtual museum, hologram
- Reproduction
- Intellectual property rights issues

So, implementing QR-code on every object in museum stores is very important not only for museum staff, but also for the researchers.

Providing online access to the collection, while maintaining the museum's copyright.

Encouraging scholars to share their up-to-date publications, archival photographs as materials, research, and knowledge of museums objects through the online access, while museum registrars review the information and decide whether it should be added to the object.

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