

Contemporary Libraries' Architecture Spaces Formation as Innovative Cultural Hubs

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Abstract

In recent years, new spaces were required for a variety of activities. This study deals with library buildings as a case study that is most important to cultural buildings. New library buildings are being built as part of the city's attempts to promote visibility, image, and brand as a desirable future and identity. A large number of new public libraries are thoughtfully constructed in rundown urban areas and former industrial zones to provide attractive new urban and meeting spaces. As a result of the recent digitization of knowledge resources, library spaces have become less popular, and they have had to reinvent their role in the urban fabric. To reach a wider audience and become vibrant spaces, libraries are redirecting their activities. The research's objective is to present and discuss some international library building designs that represent distinct cultural and socioeconomic ideas. Models were chosen from a variety of locations that, for users and frequent visitors to the context in general, were marked by change and development. The goal of the analysis of the chosen global case studies is to determine the successes and lessons learnt. Followed by case studies from Egypt from which a survey has been conducted. Four case studies from Egypt were selected from various locations in order to gather different viewpoints using a questionnaire. The study employs a theoretical analytical methodology, with case studies, comparisons, and discussions; analyzing the implementation of new activities in contemporary libraries to determine their impact on the urban and human level, as well as how they interact with the context and human perceptions. The study concludes by recommendations and suggestions to case studies based on users' preferences. The findings illustrate the changes that have taken place in modern library spaces, helping to reshape the identity of a new community or development area by creating a lively and communicative environment that will draw a big population and serve the general public.

Keywords:

Library Architecture, Iconic Buildings, Social Interaction, Place making, Urban context

الملخص:

في الفترة المعاصرة ، هناك حاجة الي فراغات جديدة لمختلف الانشطة متنوعة المستجدة. تتناول هذه الدراسة مباني المكتبات كدراسة حالة ، وهي من النماذج المعمارية الثقافية الهامة. تشمل جهود المدينة لتشكيل الرؤية والصورة والعلامة التجارية باعتبارها هوية مستقبلية وجذابة ، بما في ذلك اقامة مباني جديدة للمكتبات. لإنشاء مساحات عمرانية واجتماعات جديدة وجذابة ، تم بناء العديد من المكتبات العامة الجديدة بعناية في المناطق الحضرية والمناطق الصناعية القديمة . أصبحت مساحات المكتبات أقل شعبية نتيجة لرقمنة مصادر المعرفة ، وكان عليهم إعادة تحديد دورها في النسيج الحضري. تعيد

المكتبات التركيز علي جذب جمهور جديد والتحول إلى أماكن نابضة بالحياة . الهدف من هذه الدراسة هو تقديم ووصف بعض تصميمات مباني المكتبات العالمية التي تعكس رؤى ثقافية واجتماعية مختلفة. تم اختيار نماذج من أماكن مختلفة تتميز بالتغيرات والتطورات للمستخدمين، فضلا عن كثرة الزوار علي المنطقة . الغرض من تحليل النماذج العالمية المختارة هو تحديد الدروس المستفادة ونقاط القوة. ويلي ذلك دراسات حالة من مصر وعمل دراسة استطلاعية. تم اختيار أربع دراسات حالة من مصر من أماكن مختلفة من أجل الحصول علي آراء متنوعة من خلال تطبيق استبيان. تتبع الدراسة المنهج النظري التحليلي، حيث تقديم دراسات الحالة، والمقارنات، والمناقشات. تحليل تنفيذ الأنشطة الجديدة في المكتبات المعاصرة لتحديد تأثيرها على المستوى الحضري والإنساني ، وكيفية تفاعلها مع السياق العمراني المحيط واحتياجات المستخدم. تختتم الدراسة بالتوصيات والاقتراحات لدراسات الحالة لتفضيلات المستخدم . تسلط النتائج الضوء على التغييرات التي تحدث في فراغات المكتبات المعاصرة، لإنشاء منطقة نابضة بالحياة ومتصلة تجذب المجتمعات الكبيرة وتخدم الجمهور ، وتساهم في إعادة تشكيل هوية المناطق الجديدة او تطوير المناطق القائمة.

الكلمات المفتاحية:

عمارة المكتبات، المباني الايقونية، التفاعل الاجتماعي، صنع المكان، السياق الحضري

1-Introduction

The conception of the library progressed in the twenty-first century to include a novel blending of the classic library with its physical contents and the electronic library with access to digital items and Internet-based services.

Libraries have evolved to the changes brought about by digitization and created cutting-edge spatial innovations, (Miersch- Süß, 2021). Libraries are constantly transforming into a place where people come together to learn, interact, and socialize.

They require appropriate planning treatments for their sites and spaces that are aimed at satiating users' requests and translating them into functional and service needs; suitable for all sectors of society; in order to achieve their goals and carry out their varied functions.

The study presented Global case studies from different countries that were chosen as examples. Then, some examples from Egypt were described. As a consequence, some principles were deducted and inferred by the research from the theoretical section and literature review. A study was undertaken to find out what customers desired in order to decide for new library architecture spaces.

1.1. Aim of the research

The study aims to examine changing library programs and people, in addition a gathering place for people, in order to create new places that blend social and economic features. The study aims to formulate a suggested strategy of contemporary library and factors to be considered.

1.2. Research Methodology

The methodology is divided into three parts: theoretical, analytical followed by a pilot study and examples from Egypt. The methodologies employed in this investigation are shown in Figure 1: The study focuses on case studies from around the world in a range of countries, followed by a comparison of contemporary library as examples. In Egypt, a questionnaire was used to examine and analyze the requirements that are appropriate to be considered. Utilizing both qualitative and quantitative methods. To determine the extent of consumers' preferences, a survey was used.

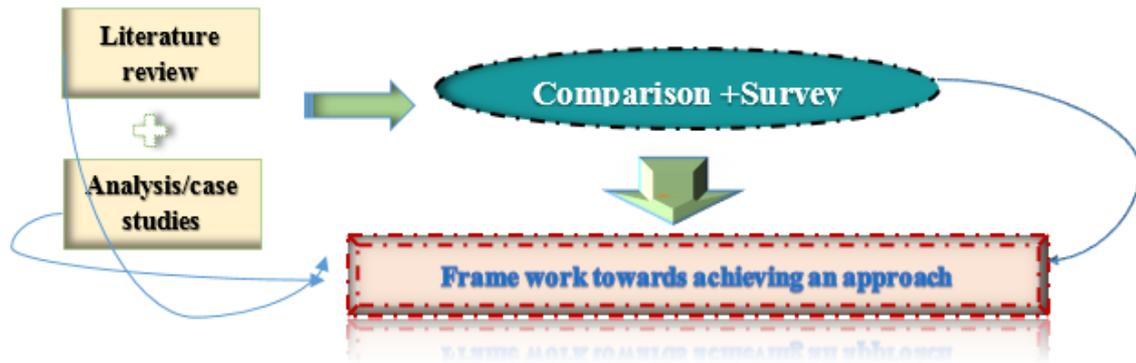


Fig. (1) The proposed methodology (the Author)

2-New Architectural Functional style:

The current era is experiencing an intellectual transformation in the field of architecture due to the influence of the technological era, the digital revolution, and the information revolution that forced on the scientific and architectural spaces. Architecture is a reflection of the spirit of the age.

Numerous changes occurred:

Buildings can serve a variety of purposes simultaneously by combining them under one roof, resulting in facilities that are versatile and converge in form.

Elimination of some jobs: Some jobs will be terminated, and it's possible that some of the locations where these activities were once carried out under conventional building patterns won't even exist anymore. The shift in architectural form and scale was a result of the change in function, and this shift had an effect on the city's total urban scale.

There are various sorts of libraries, and each of these types has traits and qualities that set it apart from the others. The national library, public library, specialty library, school library, private library, university library, subsidiary library, mobile library, and electronic library are the most well-known categories of libraries.

The study focuses on libraries that serve as landmarks in terms of their significance, geographic positioning, and user impact. It gives instances of public libraries, academic libraries, national libraries, and smaller but no less significant libraries in terms of drawing people to their varied events.

2-1. New era of the public library:

The modern public library's function as a "living room in the city" has become increasingly important in contemporary urban culture, particularly to architectural innovation during the past 20 years. (Worpole,2013)

Contemporary architecture generated clear and symbolic libraries and had an impact on the development of formations that mimicked the spirit of the moment, enabling libraries to become open cultural hubs. (Al Dares, 2015)

Information and communication technology is transforming the nature of work (ICT). (Mandal et al., 2019) Libraries' goals and functions have changed as they started to play a bigger role in enhancing education, fig. (2).



Idea stores,
London

Vancouver
public library,
Canada

Library parks,
Medellin,
Colombia,
Hiroshi Naito

Hjørring
central library,
Denmark,
2008

Bunhill place,
Australia

Street corner
university – a
community,
close to
shopping areas.

The library is
interlaced with
government
offices and a
commercial
center.

Open parks’
urban
interventions,
community
interaction.

focus on
human
relationships
and user
involvement.

A multi-
disciplinary
institution with a
library

Fig. (2) – LIBRARIES TO TAKE ON A DIFFERENT ROLE- replace the traditional brand of the “library.”

3- Libraries Evolution:

Libraries took on many different shapes throughout the 18th century, each with its unique set of characteristics. The modern method of the 20th century incorporated the novel concept of integrating public library systems with their social and cultural components. Fig. (7)



Fig. (7) Changing characteristics of library design (Sharan, 2020)

The need for a new electronic age, in which library materials are issued in electronic form and accessed through technology, changed how libraries were thought of and paved the way for the emergence of electronic libraries, which in turn led to new types of library services, at the beginning of the twenty-first century. Fig. (8).



Rolex learning center

Fig. (8) Unique form and fluid spatial concept of Contemporary Library Architecture

3.1. The digital information shift

The functional areas of the buildings have been significantly impacted by digital communications, changing the spatial dimension. (Peitx, 2017) The difficulties of the twenty-first century are transparency and information accessibility. (Miersch- Süß, 2021)

New concepts change the traditional spaces in Architecture: (Bahlol, 2014)

Use of virtual reality and simulation: The use of holograms and 3D lasers. Spaces are not defined spatially, but can move through them at an infinite speed, and therefore there are no traditional design determinants for the design of such spaces.

Liberating the external formation of buildings and spaces: The automated formation of buildings through the concept of information architecture converging with the concept of smart architecture.

Changing functional elements at the architectural and urban level: The digital revolution and the world of communications affected the functional spaces in buildings by changing the spatial dimension for performing some functions, so the users' needs will differ accordingly.

Libraries' reading halls have developed from large spaces with vast bookshelves, tables and chairs for sitting to read books to reading rooms with computers where all of the library's books are held in an electronic form that is easy to peruse navigate between them, fig. (9). (Khalil, 2014)

The traditional design of reading halls in libraries



British Library

The design is based on reading halls on electronic libraries



Open library Superpool

Fig. (9) traditional/new library design

4-Contemporary Library architecture and design

Public libraries, which have transcended socioeconomic and intellectual boundaries, attract people to study ideas and share interests. (Gamma, 2016). They have adapted to do tasks other than granting access to resources as a result of new technology., Fig. (10). They were renewed into modern-day landmarks. (Sharan, 2020)



Fig. (10) Musashino Art University Museum & Library, 2010
Renovating existing building into an art gallery, create a new combination of the Library and the Art Gallery.

Libraries have grown into lively community centers, providing new experiences and concepts for community interaction. (Worpole, 2004). Fig. (11)



Calgary Central Library, 2018

Middle East Centre Library and Archive, Zaha Hadid, 2015

Library of Tama Art University, Toyo Ito, 2007, Japan

Fig (11) Contemporary libraries

4-1. Elements for contemporary public library, (Fig. (15): (Worpole, 2004)

people	•The library is being used by an increasing number of people of all ages.
programmes	• Innovative programmes that are new
partners	•Commercial partners such as cafes , internet providers
places	•Different kind of place, open more often and more welcoming to many guests

Fig. (12) four key factors of contemporary library: (Worpole, 2004)

4-2. Principles for library design (Table (1)): (Gamma, 2016) (Author)

Table (1) Basis of principles developed the modern library.

Principles of Library Design	Definition/ User experience	Challenges	Ex:	
Accessibility and inclusivity	"accessible" is one that is easy to get to and use. Active learning center Such as: -near a transport hub - co-located with other services.	small library should be integrated with the school. The library and school deals with different style of learning and education.	 <p>Fig. (13) Active learning center</p>	Espoo, Helsinki, 2015 - The library was built with citizen participation to provide a variety of educational activities as well as cutting-edge technology.
Visibility and connectivity	'visibility' -"freely interact,": - spacious atrium with a good view of all floors, a large welcome room with well-defined circulation paths.	Rubber flooring should be used on bridges and staircases to eliminate the 'footfall' sound.	 <p>Fig. (14) Halifax central library</p>	Nova Scotia, Canada, 2014 - It includes seats that retract into wooden steps and is supposed to look like an 'outdoor' environment.

Flexibility and adaptability	<p>A 'flexible' library: must be adaptable to the changing interests of its users.</p> <ul style="list-style-type: none"> - A flexible framework - Furniture that is adaptable, amenable staff. <p>Customers can interact more easily with mobile furniture.</p>	<p>The furniture layout is not static, as it is frequently moved around the public library.</p>	 <p>Fig. (15) Taylor Family digital library</p>	<p>Calgary, Canada, 2011</p> <p>29 workrooms, with a huge flat screen fixed on the wall. Every floor has touch-screens where students can book rooms.</p>
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5- Spatial alteration – spaces and layouts of a modern library

Human activities have undergone changes as a result of technological and digital intervention in terms of their characteristics and features with regard to spatial location in the fields of work and education, as well as changes in the quality and effectiveness of health, cultural, and recreational services and their management methods. These changes will have an impact on the shape of the city and the re-spread of the city's components, causing some activities to be concentrated and others to be spread.

In addition to offering new types of spaces, classic libraries contain several areas that have experimented with layout design changes. Table (2 &3) Book stores develop into popular social hubs for many people. Rapid technological advancements have altered libraries and information services, changing the library scene. This has altered how services are delivered.

Table (2) (Sharan, 2020) (Author)

Arrival	
 Guards and librarian desks	
- The reception spaces become more pleasant and clear, supplemented with cafes and public plazas.	
Common square	
Book stacks and reading rooms	
	
- Common spaces are designed to cater to the multiple interests of users/ Supported with atriums – providing visual access of the diverse nature of the library, multi-functional, User friendly/ Gathering & performance	
Collection	
Housing big collection of works	
	

- A mix of on-site and off-site collection/ Offsite storage keeps the floor plate uncluttered and open. Stack heights have been decreased from entire walls to a human-scale height, making them more usable, lighter, and brighter.
Reading space
Instead of being separated, arranged in large halls enveloped in complete silence. study spaces: 
- Divided into several “reading pods”/ Lounge furniture is used more frequently than traditional long desks to create a more welcoming and informal atmosphere/ promote collective learning, separate rooms as glass meeting cubicle
Children’s zone
A row in the middle of book stacks 
The height of the stack is lowered and another room / furniture is attractive and acceptable. More interactive / multipurpose room

Table (3) Comparison of old and new approaches of library aspects, Re- describing the role of a library: (Author after Sufar et Al., 2012 and Sharan, 2020 and Mondal, 2020)

Criteria	Old/traditional	Current/ digital age/modern
Concept	working in a quiet place/ temple of knowledge/ standalone building	Information can be found; users can socialize with one another/ living room of the city/ shared space
Space	closed space, furniture is near to each other/ imposing steps and entrance halls	There is a lot of free room between the furniture to move around in/ street interaction and retail entrances.
Rooms	Quite place/ Separated computer rooms, large silent reading areas	Networking lively spaces/ Big reading rooms to use laptops, socialize; rooms for group-works/ library without wall.
resources	Restricted /indirect access to resources. Information resources in one access	Open Access to materials and books/ Information resource in multimedia.
Lighting	Dark Reading rooms, little and supplementary lamps.	Bright reading rooms, extra lamps on reading desks. Design features; natural lightings.
colours	Dark colors	Bright colors
Furniture material	Institutional furniture/ Heavy wood, chipboard	Club lounge furniture/ Plastic/ textiles
desks	unmovable, heavy, made of wood	Lightweight, portable, and manufactured from a variety of materials.
chairs	Hard wooden chairs, with leather seats	Portable, comfortable chairs. soft padding
Shelving	Big, heavy shelves, very tall	Easy-to-reach, movable, automatic shelves

ange in technology has become the major cause of revolution in the field of library & information services. It has changed the mode of delivery of services from traditional information sources to e-resources, online databases and online information storage & retrieval etc. Computers are being used in libraries to process, store, retrieve and disseminate information. Now a day’s libraries are not judge by quantitative resources. These drastically changes, if managed properly can be used effectively and efficiently to provide the right information to the right user at right time. The Information and communication technology not only affected the complex housekeeping operations of libraries, but also facilitates communication through networks for collection, storage and dissemination of information and have become a vast ocean of internet-based servi

Figurative form imposing to tourism escorted attraction	Floating domes, space-age, free- soundproofed pods	Open, column free space allowing for constant change and multiple uses
		
Tianjin Binhai library	Tokyo Seiki library University	locHal library

Fig. (16) Examples of modern Libraries

6- Contemporary Architecture Form and its Relation to Urban Context

The library forms the basis of the cultural environment in the city, and reflects the spatial, historical and social components of the surrounding areas.

Factors affecting the connection of the building with the surrounding environment: (Al Dares, 2015)

- 1- Moving from emptiness to the concept of place.
- 2- Style
- 3- Existence of the building as an independent element.
- 4- The presence of the building within the context of the imposed environment.
- 5-The factors that stimulate creativity and competition.
- 6- Suspense and mystery
- 7- The components that create communication with the real reality and link the building with the past and confirm the identity of people.

The library constitutes the basic base for cultural and intellectual exchange and social communication. The image of the traditional library changed, and information became freely available, and the book was no longer the only source of information, so the library began to adapt to a new stage in organizing its spaces after it was characterized by a special style.

Despite the fact that the electronic and virtual world is starting to take over and place more and more emphasis on the physical book as a fundamental component of society's cultural life. Highlighting the library's physical location within the city to promote the development of knowledge-based urban environments. This necessitates a reevaluation of the reader's connection to the environment, the book, and the stores and reading areas for printed and electronic resources.

6.1. Effect of contemporary library on Urban context

Within urban regeneration plans, the library can serve as an icon, a placemaker, and a source of communal vitality. (Hansen et Al., 2012). Fig. (17) depicts Peckham Library in London, A rejuvenating-project to modernize the area and create a social place for the local population. The architect presented a unique idea that distinguishes the library and makes it a symbol of rhyming revival in disadvantaged areas in south London, achieving a shift in the design of public library models by creating spaces that stimulate entry and cultural communication within them. (Al Dares, 2015)



Fig. (17) Peckham library London borough of southwark, 1999

A focal meeting point in the area, symbolic façade, adding new image and identity. (Hansen et Al., 2012)

6.1.1. Library as iconic building in context

Technological developments have given rise to new architectural forms. Modernity brought ideas like singularity, strangeness, and shock. As an icon, a library can support or alter the perception that people have of a city or neighborhood. (Alfred, 2015)

According to (k. Elhagla et Al., 2020), the physical elements that distinguish an iconic structure as a distinguishing feature—which is typically visible to the general public—are the first degree of influence. As a marketing tool that influences how the city is perceived, the iconic building is featured on the second degree. The third level consists of users and their interactions with famous structures.

Application:

Steps followed: Analysis-Comparison-A suggested approach

The application study starts with analysis of library-building projects from different Countries. Followed by case studies from Egypt and a survey. Then, followed by an approach of a multidimensional model, which consists of physical, social and digital space was suggested.

7- Case Studies:

This part deals with World's case studies, then compares the research examples in order to clarify the concept of contemporary library.

7.1 Global Case Studies

7.1.1 Criteria of Selection

The case studies were chosen based on several reasons; as follows:

- Geographical diversity, where an example was chosen from Japan, USA, Denmark and UK.
- Having iconic qualities in terms of revival of the urban context.
- Using modern approach such as flexibility.
- Study of the connection of contemporary library buildings with the urban fabric.

The selected projects were listed by name, location, architects, year, location.

Analysis deals with study of: Main idea, project description, exterior form/ scale/skyline, interior articulation, spatial character of the building, examine innovative aspects and flexible approach, other activities embedded within the project, as seen in tables from (4) to table (8)

Table (4) – Case study 1 – Sendai Mediatheque (the Author)

Name:	Sendai Mediatheque	Country: Sendai, Japan	Architect: Toyo Ito & Associates	Year: 2001
Location and context	 <p>Fig. (18) The building appears as an icon due to its unique form in comparison to its surroundings.</p>		 <p>Fig. (19) The presence of the building, and its success in drawing local and visiting users, resulting in the opening of numerous new enterprises. (kronenburg,2013)</p>	
Main idea	- To build a free and open media center that combines various functions into a single complex (Latimer, 2011), Mediatheques, which encompass all forms of media (physical and digital).			
Project Description	- To bring the library closer to the people; removing the seclusion of the traditional library; fluid structure enclosed within a rigid city block. (Ito, 2001)/ analogous to enormous trees in a forest and serves as light shafts, storage of the utilities, networks, and systems. A flexible exhibition space with movable walls on the 4 th and 5 th floors.			
Exterior form/ scale/sky line	 <p>Fig. (20) transparent allows the surrounding community complete visibility.</p>			

Table (5) – case study 2 – Seattle public library (Author)

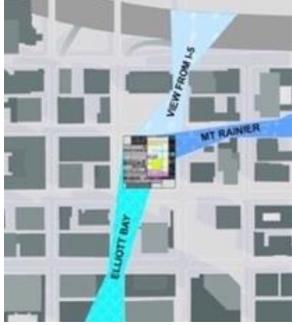
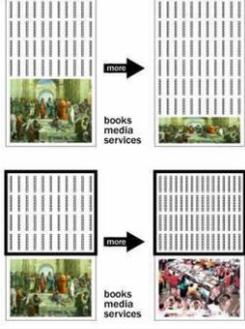
Name:	Seattle public library	Country:	United States	Architect: Rem Koolhaas	Year: 2004
Location and context					<p>Fig. (21) library that serves as a hub for information delivered in a number of formats. -spiral-shaped container with a restricted amount of space separate from the public regions allocated to user activities.</p>
	<p>- A destructive new public library typology with the goal of reinventing the library and its mission.</p>				
Main idea	<p>- A destructive new public library typology with the goal of reinventing the library and its mission.</p>				
Project Description	<p>- Like a rough-cut diamond, an unusual glass and steel architecture. (Hansen et Al., 2012) - Introducing the concept of contemporary flexible spaces in a new way, creating a space for the dissemination and circulation of knowledge in various media, includes an innovative system to accommodate physical book collections using a system of flexible and open bookshelves within comfortable open spaces. (Al Dares, 2015)</p>				
form					
<p>Fig. (22) Irregular Form/ open flexible spaces</p>					

Table (6) – Case study 3– National Library of Denmark and Copenhagen University Library (Author)

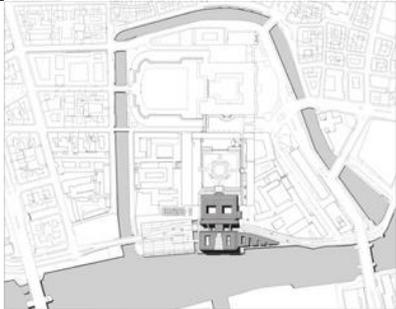
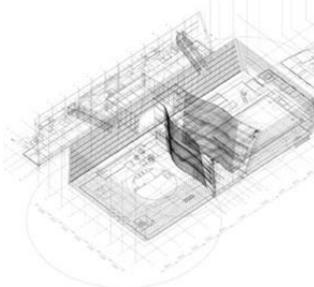
Name:	National Library of Denmark and Copenhagen University Library, University of Copenhagen.	Country:	Denmark	Architect:	Schimdt Hammer Lassen	Year: 2013
Location and context					Fig. (23) The central atrium offers panoramic views of the harbor and is an important light source that diffuses throughout the structure.	
	-A 19 th and 20 th century structures that have been altered to accommodate the changing needs of scientists through internal extensions and alterations.					
Main idea						
Project Description	<p>-The library is located in the historical heart of Copenhagen and overlooks on one side the city's waterfront and on the other side the library. (Al Dares, 2015)</p> <p>- Numerous skyways connect to the original structure; united buildings have greater room than before. The Reading Rooms are double-height rooms, providing natural light.</p> <p>- Reduce 'formal services' / a mix of design styles is used.</p> <p>- A contemporary block distinct from the historical fabric, linked directly and in a linear relationship with the old library, characterized by the nature of dealing with the site and its urban and natural components alike, achieving a radical transformation from the traditional library, in terms of the nature of design, materials used, simplicity of architectural formation, transparency, color and texture. (Al Dares, 2015)</p>					
Form						
Fig. (24) National Library of Denmark						

Table (7) – Case study 4 - Library of Birmingham (Author)

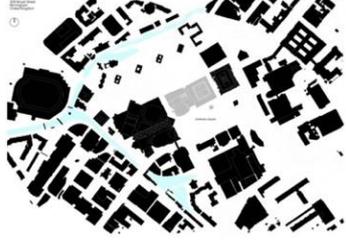
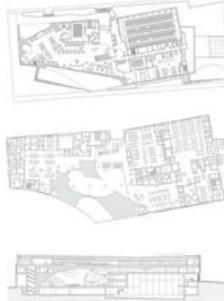
Name:	Library of Birmingham	Country: England	Architect: Mecanoo	Year: 2013
Location and context	 <p>Fig. (25) the busiest route connecting the Bullring, New Street Station, Victoria Square, Centenary Square, the International Conference Center and the red and blue brick canal sector at the International Conference Center.</p>		 <p>Fig. (26) Centenary Square turns into a public space that contains 3 different zones: monumental, cultural and leisure. This is a multi-period urban narrative experience in Birmingham's history.</p>	
	<p>Main idea Attract visitors from all over the world, a city that has been resurrected as a cultural attraction.</p>			
Project Description	<p>-Interconnected and overlapping rotundas give natural light and ventilation. -Assisted in the revitalization of the city's cultural heart and the connection to the city core. The library is viewed as part of urban branding of the city. (Hansen et Al., 2012) -BREEAM certificate: a number of energy-saving strategies, maintaining energy efficiency through material selection, utilization of shade in design elements, inviting natural sunshine.</p>			
Exterior / interior form				
<p>Fig. (27) main public area in the center of the city</p>				

Table (8) – Case study 5 - Charles library- temple university(Author)

Name:	Charles library	Country:	Architect: Snøhetta	Year:	2019			
Location and context	 <p>Fig. (28) Sited at the intersection of two major pedestrian pathways. -connecting the building with a variety of collaborative and social learning spaces.</p>	 <p>Fig. (29) Plazas slope up to the library entrances, welcoming people in and giving space for outdoor classrooms and casual meetings, according to the landscape and site strategy.</p>						
	Main idea	Glass is glazed on all four sides. The roof gardens, which feature up to 15 distinctive species, afford a rich urban habitat as well as a soothing visual backdrop to the vistas, allows connection to nature and an important aspect of the site's stormwater management system.						
Project Description	-Vertical sections of split-faced granite clad the sturdy base. At the three main entrances, large expanses of glass provide maximum transparency, an all-mobile technology strategy.							
Exterior/ Interior articulation				<p>Fig.(30)- Refining visual and physical connectivity to academic materials and boosting learning throughout social contact.</p>				

7.1.2. Analysis of Case studies:

After studying case studies, a comparison (table (10)) between case studies; on the five selected examples, based on the summary of the previous tables No.(5) to (9):

Analysis of the characteristics of the context and the relationship with its buildings:

The analysis process can be divided into three main axes: (spaces / buildings/ distinctive features) in order to determine the elements of compatibility with context.

Table (9) Case studies comparative analysis matrix (By Author)

Contemporary Library		Case Study 1	Case Study 2	Case Study 3	Case Study 4	Case Study 5
		Sendai Mediathèque	Seattle public library	Royal Library: National Library of Denmark and Copenhagen University Library	Library of Birmingham	Charles library at temple university
Year		2001	2004	2013	2013	2019
Country		Japan	USA	Denmark	England	USA
Exterior Form		The building is considered as icon, due to its different form in contrast to its context	Unique geometric form provides shade (daylight)/ each side reacts to different specific urban condition	An important landmark covered in black granite reflects the development of the harbor front.	A translucent glass building with a filigree skin inspired by artisan history serves as a signature landmark.	Unusual geometry arched entries and expansive plazas intend a welcoming invitation to all visitors.
Spatial transformation/ Flexible Approach	(spaces & layout)/ Interior environment (criteria and parameters)	Flexible exhibition with movable walls, diaphanous, flowing spaces, diffuse Architecture	Compartmentalized flexibility/ programs are not separated	Altered the traditional view of a library; families and readers to spend a whole day learning	Flexible seating/ rearrange the furniture. Adaptability of spaces, more seats.	Reducing the space required for book storage using automated storage enables increased space for study

New dimensions	New uses/ services	√	√	√	√	√
	Innovative spaces	each level's interior was designed by a different designer . Café, retail store, and communal area that can accommodate film screenings and other events	A 600-seat theatre, exhibition spaces, a bookshop, a restaurant, a café, and a roof terrace are all part of the top-lit atrium that cuts into the building with a vast glazed façade overlooking the port.	(When needed, the shape produces shade or exceptional amounts of brightness), contextual (each side reacts differently to specific urban conditions or desired views).	Filigree creates a strong sense of place and a constantly changing landscape. The formal and informal areas for reading and attending library events have been transformed into dynamic town squares.	The high-density automated storage and retrieval system (ASRS) stands 57 feet tall and spans three levels of the structure, with a capacity of nearly 2 million volumes
Contemporary library as a place						
Iconic buildings in context	Strategic element in urban development/ Contribute to reinforcing the city brand as an attractive future & experience-oriented city.	Attracting local and visitors' users	Has iconic qualities. The diversity of the mass-formation of the library is shown from the various intersections - the relationship of the entrances to the context.	create an informal public place, spaces are dynamically and spontaneously crowded with people and filled with the movement of the public,	An icon, symbol of the city, urban branding	Dynamic urban context

				creating an interactive life by linking public and private spaces and emphasizing the public space surrounding the building to create a meeting point.		
Extension to classroom	New pedagogies / Interactive learning	√	√	√	√	√
Library as a transformative element	Transform learning environment to more social and interactive spaces					
Principles	Accessibility and inclusivity	√	√	√	√	√
	Visibility & connectivity	√	√	√	√	√
	Flexibility & adaptability	√	√	√	√	√

7.1.3. Analytical results on case studies:

The chart below concludes comparative analysis between case studies according to the principles: Measurement suggested used as follows: (100% fully achieving- 75% partially achieving- 50% not so influential)- (the Author)

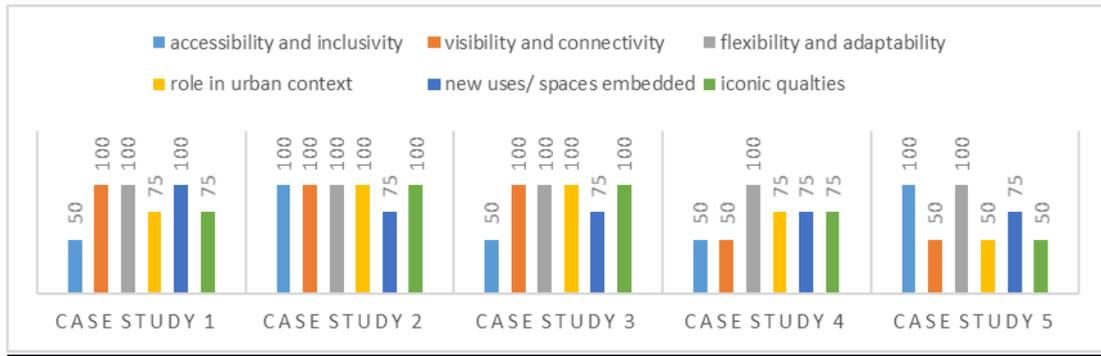


Fig. (31) chart showing results of comparative study

From the comparison in the previous table (Table No. (9), it can be concluded that: The design idea of the buildings is related within the meaning with the form and function through the basic design idea.

A study of the connection between the library and the urban fabric, as well as the extent of its impact on the dynamics of the surrounding context.

A revitalization of the surrounding environment, showing the importance of libraries as iconic buildings.

7.2. Case Studies of libraries in Egypt

Four case studies were chosen from Egypt by which showing significance in building or location and well-known for researches. (Table (10) depicts reasons for choosing each library).

Table (10) Case Studies of libraries in Egypt

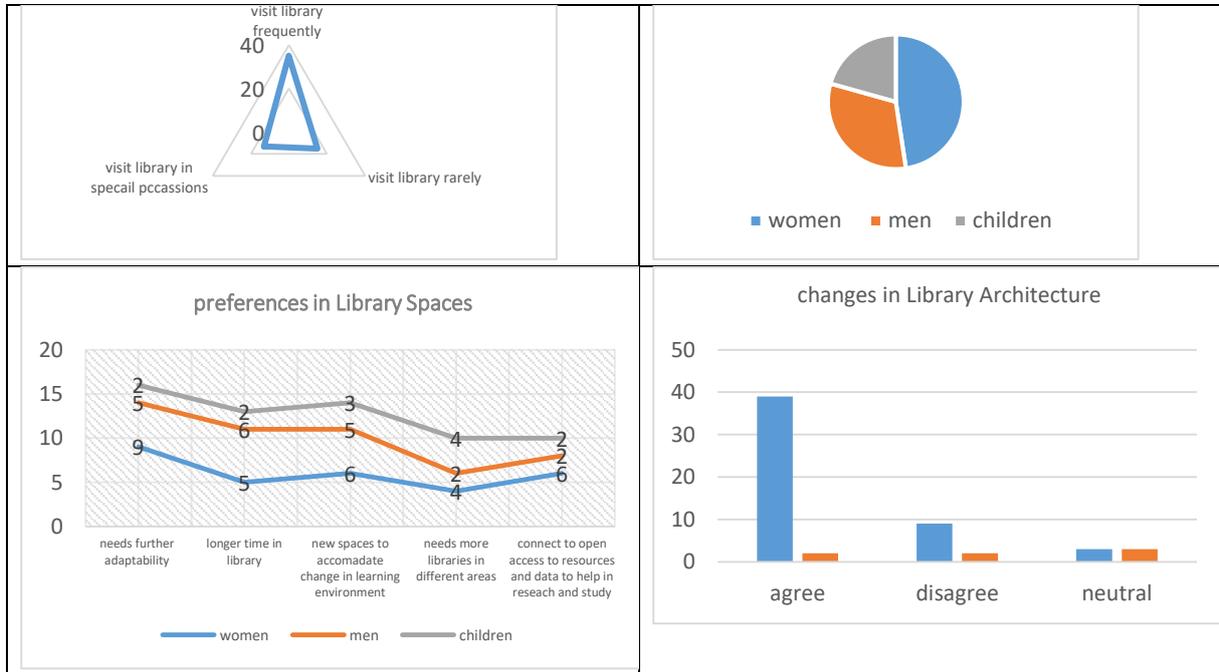
<p>Alexandria Library</p>	 <p>Fig. (32) One of the iconic buildings that shows Modern Architecture.</p>
<p>Diwan Library, Zamalek, Cairo</p>	 <p>Fig.(33) Diwan Library has many branches all over Egypt and has the concept of taking a refreshment embedded within the space so people have the chance to read and also can buy.</p>

<p>Greater Cairo Public Library</p>	  <p>fig.(34) Reuse of old building and has great potentials in terms of location and view on the river Nile.</p>
<p>Misr Public Library</p>	  <p>Fig.(35) Readapting historic buildings to new uses as public library</p>

7.2.1 Questionnaire

A questionnaire (Appendix A) was designed to take opinions in Egypt about Contemporary library needs and their visions towards their opinions about changes in learning environment and how libraries satisfy their needs. The questionnaire included number of samples is 70 from the four different Libraries, responded 63 (different age groups). Table (11) shows some results from the survey employed as follows:

Table (11) Questionnaire results charts (Author)



Questionnaire outcomes:

- Due to COVID-19 pandemic, changes in learning environment which leads to:
- Need for more electronic data in studying and reaching data.
- Need for workspaces and places for Students, Researches and Children to take online classes and sessions.
- Need for long time open adaptable spaces.

- Less contact with paper material and depending on electronic ones.
- Meetings, conferences, workshops shifted to online instead of gathering physically.
- Schools shifted to online lead to new spaces suitable for different age groups to attend their school and university classes.

8- Results:

By studying different case studies, the following can be concluded:

- The shift from the concept of the building to the concept of place.
- The importance of visual communication from the library spaces towards the context and vice versa and Visual communication within the library spaces.
- The integration between the spaces of the building and the surrounding green spaces.
- The clarity of the entrances and their relationship with the external space.
- Library facilities and services are evolving to meet new cultural needs and interests, in response to the development of new media, at an ever-increasing rate of cultural and technological transformation.
- Organization of books on shelves: Modern ways for best space utilization.
- Traditional library layouts must be altered or replaced, as services and functions evolve.
- Seating Arrangements: Spaces must be appealing and magnetic to potential users, with lounge furniture to provide a pleasant environment.
- Modern facades: New materials and forms in architecture.
- Additional rooms and halls: Some appear to be linked to workshops, exhibition zones, or additional function rooms or spaces.
- To attract people, public areas are often complemented by services as cafeteria connected to a reading room or social media connection. This contributes to the development of a cultural society with a focus on conversation and active knowledge sharing.
- The central library could be a multifunctional creating space in the urban setting.
- The university library could be an opportunity to transform spaces into more social spaces
- The public library could be an experiential space, retail and corporate identity.
- Visual identity could be reflected on interior and exterior spaces.

9-Suggested Strategy: Factors to be considered in Contemporary Library Architecture

(Author)

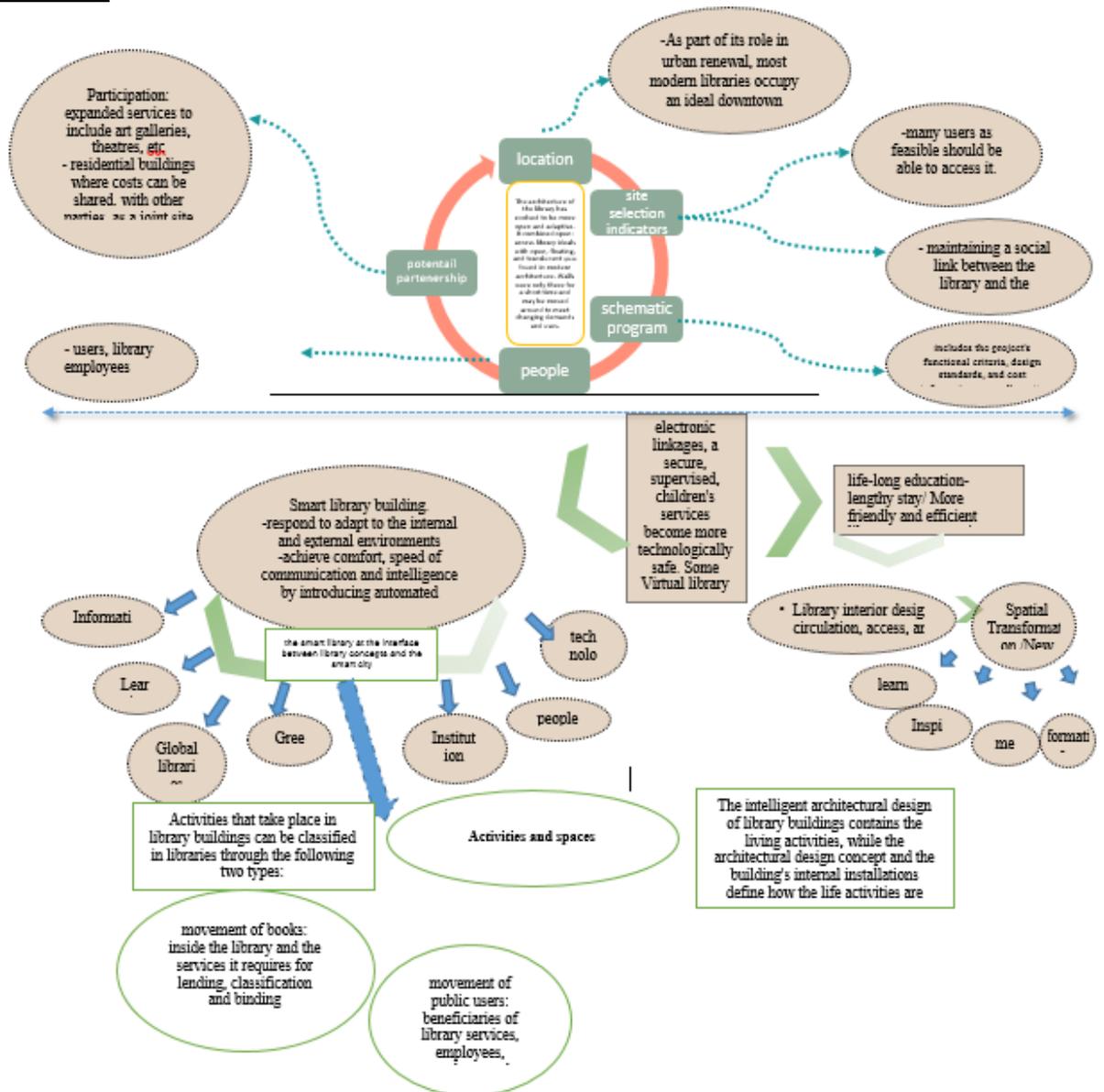


Fig. (36) Suggested strategy (Author)

Ideas as solutions to be implemented in the case studies in Egypt according to survey outcome and to the suggested strategy. Table (13) (the Author):

The flexibility and adaptability of a building should allow it to accept changing usage patterns. A variety of integrated study areas should be provided. The best libraries provide high-quality services so that beneficiaries can participate in a variety of activities inside the library's boundaries. The greatest libraries today mix sections for different forms of library use and engagement with collections with the provision of print and digital items in reading rooms and other areas. (Gupiyem et Al., 2021)

<p>Alexandria Library</p>	<p>Alexandria library has fulfilled the location and schematic program The view can help the building to correlate with potential partnership to develop extra places to attract local visitors. New technology was introduced and can be easily implemented in the iconic building. The urban context has been affected directly, reviving the whole place, helped in branding the city.</p>
<p>Diwan Library, Zamalek, Cairo</p>	<p>The concept of diwan library was to present the culture in new different way. Many activities are introduced in the library and people has the chance to get to deliver knowledge through various ways. It attracts different segments, locations can be more welcoming by which locating such libraries in iconic buildings.</p>
<p>Greater Cairo Public Library</p>	<p>Many developments can be achieved being in distinguished location on the river Nile in heart of Cairo reusing historic building can be a potential for many students and scholars. Many events can be held in parallel with the traditional formal function of visiting a library such as exhibitions and seminars of famous writers talking about important topics.</p>
<p>Misr Public Library</p>	<p>Being available to different segments of society in which activities were available such as workshops and children’s programs in summer. The place is an attraction in terms of reusing a palace.</p>

10-Conclusion and Recommendation:

- City libraries today are viewed as a vital and necessary resource. The way that academics and students view libraries is evolving.
- Libraries are increasingly focusing on the experience of interacting and working with the community rather than just providing access to materials.
- The introduction of an innovative library architecture and a new approach to library space.
- In order to adapt to future technology advancements, spaces must be more adaptable, with designs for open spaces, transportable fittings and furnishings, and integrated technical installations that may be moved. Areas have been designed for visitors to read, ponder, study, and work. The conversion of the educational in the 21st century transforms libraries into vibrant, various learning hubs.
- The results show that responsive and well-designed public library services can promote greater social cohesion and a stronger feeling of local identity.
- Library spaces has been altered from spaces of objects to spaces of interactions. There has to be more locations for people rather just book spaces.
- The definition of libraries in the 21st century is based on the sorts of study areas rather than collections, a variety of venues for various users, a variety of study spaces for the same user at various times. Readers want pleasant libraries with ergonomic furniture, decent lighting, good ventilation, and good temperature management. The Right Environments for Learning, Readers need a social gathering place in the library where they can freely discuss their work with others across disciplines. Equal provision, adaptability to annual change. Libraries are also using outdoor spaces to enhance the patron experience. COVID 19 has underscored the value of including outdoor areas in the design of library facilities.

11-Further future study:

Examine library users and their physical environment, particularly the interaction between the physical environment and user behavior.

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Appendix (A) – Questionnaire

Question 1	How frequently you visit the library?	
Question 2	What spaces do you prefer?	
Question 3	What are your needs in the library?	
Question 4	Do you think change in learning environment due to COVID-19 pandemic change the library architecture spaces?	
Question 5	Do you find the library building an important landmark in the area built in?	
Question 6	In your opinion what is your preference in Library spaces?	Needs further adaptability
		Longer time in library
		New spaces to accommodate change in learning environment
		Needs more libraries in different areas
		Connect to open access to resources and data to help in research and study