2022

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INTERNATIONAL JOURNAL OF CONSTRUCTION MANAGEMENT
https://doi.org/10.1080/15623599.2020.1742626

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Public-private partnerships as an approach for alleviating risks associated with adaptive reuse of heritage buildings in Egypt

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ABSTRACT

The status of heritage buildings in Egypt has remained threatened for decades as a result of many factors such as negligence, ignorance and lack of resources, which consequently led to degradation. Hence, opportunities to utilize these buildings efficiently are wasted. Adaptive reuse of heritage buildings has proven to be a beneficial, yet risky approach in Egypt. Additionally, the pressuring demands on the government to conserve these heritage buildings and satisfy other public demands have been growing even more recently. Accordingly, there is a need for the involvement of the private sector to aid the government in its adaptive reuse initiatives and managing its associated risks. Public-private partnerships (PPP) for heritage conservation have been successfully conducted in various developed countries. However, such an approach has received little attention in Egypt and developing countries. The purpose of this paper is to investigate the role of PPPs between the public sector (governmental bodies) and the private sector (mainly Architectural Design Firms (ADFs) and heritage developers) as an approach towards alleviating risks associated with adaptive reuse of heritage buildings in Egypt. The research contributes to the field of study by identifying and analysing a set of adaptive reuse risks of heritage buildings that could be used by governmental authorities and architects/developers to understand and manage such risks through risk sharing in PPPs.

KEYWORDS

Heritage buildings; conservation; adaptive reuse; risk allocation; public private partnerships

Introduction

Heritage buildings represent a fundamental part of any country's identity. The Central Public Works Department (CPWD) (2013) states that heritage buildings are the physical records of how a country is and how it came to be. Egypt possesses significant layers of heritage buildings constructed in different eras, which gives the country a distinguished social identity and urban character (Gharib 2009). Unfortunately, Egypt has been facing a considerable number of threats regarding the preservation of its heritage buildings such as negligence, degradation and demolition. The situation intensified dramatically after the 25th of January revolution in 2011 (Ghanem and Saad 2015; Khodeir et al. 2016; Said and Borg 2017). Heritage buildings should be conserved for future generations as they link communities with their history. Towards revitalizing and generating sustainable values from these buildings, many heritage buildings of cultural and historic values are being adapted and reused rather than being demolished (Bullen and Love 2011a). Adaptive reuse is a term associated with the process of altering a building to fit changed needs and new functions (Plevoets and Cleempoel 2011; Pape 2016). Moreover, Plevoets and Cleempoel (2011) stated that according to contemporary conservation theory and practice, adaptive reuse is a vital strategy towards conservation of cultural heritage. However, there are several risks associated with adaptive reuse that may hinder the decision to choose such a strategy for heritage conservation, as will be discussed throughout the paper.

The Government of Egypt (GOE) has a prominent role and responsibility towards the conservation of heritage buildings as a part of Egypt Vision 2030, following with the global agenda of the Sustainable Development Goals (SDG), and as being the main responsible entity for heritage protection. However, the pressure to fulfil other public demands along with lack of financial resources, skills and professionals (Gharib 2009; Khodeir et al. 2016) called for the involvement of the private sector that possesses the mandatory skills and resources, to play their role towards supporting the government in carrying out heritage conservation projects and managing associated risks (Macdonald 2011). Such involvement could take place in the form of a public-private partnership (PPP), where private and public sectors in such an agreement share risks, resources and rewards (Macdonald 2011).

Many studies and projects have been conducted on PPPs for heritage conservation in several countries such as England, Australia, Canada and Italy (Badawi 2017). Meanwhile in Egypt, PPPs were only used for large infrastructure and construction projects, such as the New Cairo Wastewater Treatment Plant Project. None of these partnerships were organized for heritage building conservation projects, where heritage conservation projects are funded mainly by governmental authorities or grants supplied by international non-governmental organizations (NGOs). It is worthy to note that a central principle of risk allocation in PPPs is that each risk should be allocated to the partner which can manage it best, therefore mitigating risk impact. Thus, a PPP agreement could be used as a tool to assist governments in achieving conservation of heritage buildings (Gharib 2009; Macdonald 2011; Chung 2012; Badawi 2017) through partnering with the private sector, being Architectural Design Firms (ADFs) or developers specialized in heritage conservation. Thus, the purpose of this paper is to investigate the role of PPPs between the public sector (governmental bodies) and the private sector (ADFs/developers) as an approach towards alleviating risks associated with adaptive reuse of heritage buildings in Egypt.

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Research objectives and methodology

In order to achieve the previously mentioned aim, a qualitative research methodology, consisting of a literature review and case studies analysis (see Figure 1), was designed to achieve three objectives:

1. Building a comprehensive background about the research topic by covering heritage buildings and their status in Egypt, adaptive reuse and its risks, and PPPs for heritage conservation. This objective was achieved through carrying out in-depth literature review, which is a principal activity in the research process. The literature review was conducted in a systematic way depending on textbooks, academic and professional journals, conference and seminar proceedings, dissertations and theses, organizations and government publications as well as Internet and related websites and online newspapers. Using different sources for literature review is known as "Triangulation" which aims to increase the reliability and validity by verifying findings of data from one source with other sources. This strategy reduces the risk and bias associated with using a specific source (Maxwell 1996). Keywords including heritage buildings, heritage conservation, adaptive reuse and adaptive reuse risks/challenges/obstacles, heritage challenges in Egypt, PPPs and heritage conservation PPPs, roles of partners in PPPs and risk allocation in PPPs were used to focus the search process. Collected data, which covered a period of 20 years, was scanned and relevant materials were selected for in depth reading. Information from the selected materials were recorded, synthesized, analysed and classified. Materials quoted in this research are cited in the references list.
2. Presenting and analysing case studies for providing in-depth understanding of the following; four cases were designated for the further understanding of adaptive reuse risks through real life examples in Egypt and developing countries. Additionally, a successful adaptive reuse case study in Egypt is analysed and another case study is outlined briefly as a best practice case of PPPs for adaptive reuse of heritage buildings in an international context. Finally, three Egyptian cases were presented to display how PPP could be applied in the Egyptian context, its benefits for each partner and implications. The detailed criteria for case studies selection is outlined before the analysis of each group of cases, given the different nature and aim of each case study analysis.
3. Outlining research conclusions and recommendations useful to the GOE and all interested parties to help in mitigating adaptive reuse risks as part of a strategy towards protecting and revitalising heritage buildings in Egypt.

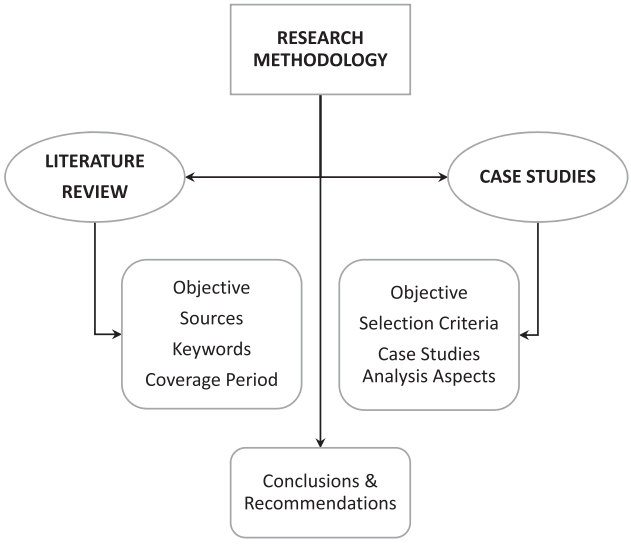

Figure 1. Research methodology (Developed by Authors).

Heritage and heritage buildings

Definition, values and importance

Kodobolt (1995, cited in Wilkinson et al. 2014) defined heritage as an expression or representation of the cultural identity of a society in a particular period. The Central Public Works Department (CPWD) (2013) described a heritage building as any building, which requires conservation due to possessing historical, architectural, aesthetic, cultural, environmental, ecological significance or all the aforementioned values, including any part of land adjoining the building. Hence, they represent a major resource to any country on economic, cultural and social levels, as well as being a non-renewable one (Shipley et al. 2006). They are considered part of heritage-based tourism, which is deemed as one of the largest and fastest growing sectors of the global tourism industry. Thus, they offer possible development and economic support for local communities, which in turn improves the quality of life by generating employment opportunities (Ghanem and Saad 2015). Beyond this direct value, heritage buildings possess the potential to create indirect value through cultural benefits, creating positive effects on the living environment and surrounding communities, offering what is called "spatial quality" (Wilkinson et al. 2014). For those reasons, heritage buildings demand an approach specific to their context as they were constructed in different times with different materials and structural forms, thus, they perform quite differently compared to modern buildings (Khodeir et al. 2016).

Heritage buildings in Egypt

Current status

Egypt has been facing a considerable number of threats regarding its urban heritage (Gharib 2009). These problems are diverse and exist on many levels including environmental, social, economic, technical and legal. However, a problem that has been overlooked for years is the ongoing demolition of heritage buildings. Under law 144 of the year 2006, "*It is prohibited to demolish or add to any building of significant architectural style related to national history or a historical figure, a building that represents a historical era, or a building that is considered a touristic attraction*" (Gharib 2009; Said and Borg 2017). Controversially, since the January 2011 revolution, the rate of loss of heritage buildings has risen dramatically; approximately more than 40 buildings have been demolished in Alexandria alone as of July 2014 (Said and Borg 2017). These demolitions are a result of multiple reasons such as lack of legislation and stern governmental measures to protect heritage buildings from demolition, misuse and alteration (Gharib 2009) and lack of public awareness and education of the value of heritage buildings (Khodeir et al. 2016; Badawi 2017).

Furthermore, there has been a tendency by governmental policies to favour tourist-orientated projects (Gharib 2009). The general consensus is that these types of buildings (especially the ones less than one hundred years old), scattered across the country (see Figures 2 and 3), are not the particular type which normally attracts tourists to Egypt. Such heritage is considered *modern* and not particularly rare or very old, which gives people a notion of a lack of its importance, consequently, reluctance to

Figure 2. Said Halim Pasha Palace, Cairo, Egypt. Status: Vacant (Raafat 2001).

Figure 3. Villa Ambron, Alexandria, Egypt. Status: Demolished (Fouad 2014).

the idea of its conservation (Said and Borg 2017). Other problems can be associated to technical and financial issues, which will be discussed in later sections. Unfortunately, these accumulated built heritage problems and their negligence have negative implications, leading to a current status of heritage buildings that is very critical and risky; the degradation of heritage buildings consequently leading to vacancy or demolition. Accordingly, this status poses a threat to the country's tourism and economic development, and leaves it with less cultural heritage of this type to be preserved for future generations (Heba 2011). Figures 4 and 5 show the degree of negligence towards some heritage buildings in Egypt. However, despite the current situation, the government is trying to address those issues by formulating initiatives for heritage protection.

Government challenges and initiatives

Egypt's Vision 2030 has been launched as a working plan in line with the 2030 SDGs. According to the Ministry of Planning, Monitoring and Administrative Reform (MPMAR) (2016), Egypt developed three strategic objectives for culture to be achieved within the next 15 years; the third objective is concerned with protecting and maintaining Egypt's heritage through "means of protection, maintenance, and awareness as well as attracting local and international visitors". The GOE is aware of the challenges facing its cultural heritage and has identified those challenges and divided them into three sets based on their impact from highest to lowest (Table 1). Alternatively, Figures 6 and 7 show a palace that was successfully reused by the government and opened in 2017. However, the renovation process took almost 12 years (Ahram Online 2017).

Figure 4. The Egyptian Scientific Institute in Cairo, Egypt amidst 2011 revolution clashes (Archhistdaily 2012).

Figure 5. Villa Casdagli in Cairo, Egypt after fire damaged the façade (Pathan 2013).

Table 1. Challenges facing cultural heritage protection in Egypt (Developed by Authors based on MPMAR 2016).

Priority	Challenge	Impact
Great impact	• Poor cultural and heritage institutions • Disagreement over specialties • Lack of coordination	• Disparity in the services provided in terms of quality and availability. • Inefficient use of the various resources available to all governorates.
Relatively limited impact	• Lack of financial allocations to protect heritage • Lack of digital information about heritage	• Financial allocations are not proportional to the size of heritage sites which require conservation. • Inadequate international/ technological advances, affecting the ability of Egyptian heritage to attract tourists.
Lower priority	• Threats to sites from groundwater • Vandalism	• Loss of heritage.

Adaptive reuse

Definition

The term "adaptive reuse" can be described briefly as a strategy towards repairing and restoring existing buildings for continued use.

It includes 'remodelling', 'retrofitting', 'conversion', 'adaptation', 'reworking', 'rehabilitation' or 'refurbishment' (Plevoets and Cleempoel 2011). Each term has a different meaning and adaptive reuse can encompass some or all of them. Wilkinson et al. (2014) explained adaptive reuse as "any work to a building over and above maintenance to change its capacity, function or performance, in other words, any intervention to adjust, reuse, or upgrade a building to suit new conditions or requirements".

Adaptive reuse of heritage buildings

The Department of Environment and Heritage (DEH) (2004) describes adaptive reuse of heritage buildings as the introduction of new services, new use, or changes to safeguard the heritage item. Sometimes a building cannot operate anymore with its original use, and the only method to conserve its heritage values and significance is through adaptive reuse. Successful adaptive reuse of heritage buildings involves a modification process that respects and protects the built heritage originality and significance, upgrades the performance and adds a contemporary layer that fits modern standards and users' requirements, which in turn provides value for the future (DEH 2004). Additionally, it respects the effort, skills and dedication that the original builders invested in the building. Accordingly, adaptive reuse of heritage buildings is regarded primarily as a form of heritage conservation (Bullen and Love 2011a). Bullen and Love (2011a) and Othman and Elsaay (2018) further explain that heritage building conservation through adaptive reuse could be viewed as a part of a sustainable strategy since the outcomes of adaptive reuse include material and resource efficiency improvements (environmental sustainability), cost reductions and financial rewards (economic sustainability) and finally, retention (social sustainability).

Figure 6. Aisha Fahmy Palace, Cairo, Egypt (Egypt Independent 2017).

Benefits of adaptive reuse

Adaptive reuse gives a second life to heritage buildings, reconnects them with society and preserves the past for the future (Bullen and Love 2011a; Wilkinson et al. 2014; RICHES 2016). It carries many significant benefits to the community, government and developers/architects since it can be particularly helpful in the quest to reduce environmental, social and economic costs of continued urban development and expansion (DEH 2004). It also helps in increasing the life of buildings and thus aids in meeting the growing demand for facilities. Furthermore, adaptation can help in transforming heritage buildings into usable, accessible spaces in a sustainable manner hence enhancing human interaction and social cohesion (Bullen and Love 2011a). It can also save energy typically used for demolition and re-build and increase financial value through creating commercially viable investment assets (Othman and Elsaay 2018). Figure 8 summarizes other benefits of adaptive reuse, and the following section illustrates a successful adaptive reuse example in Egypt and its benefits.

Successful case study: Alexandria National Museum, Alexandria, Egypt

Objective

The objective of selecting this case study is to display that employing adaptive reuse in Egypt is an approach that is already being used by governmental authorities to protect heritage buildings, albeit not so inclusive of many heritage buildings. Also, to display that adaptive reuse of built heritage is a successful approach to heritage conservation, that provides several benefits, as shown in Table 2.

Figure 7. Interior of Aisha Fahmy Palace, Cairo, Egypt (Egypt Independent 2017).

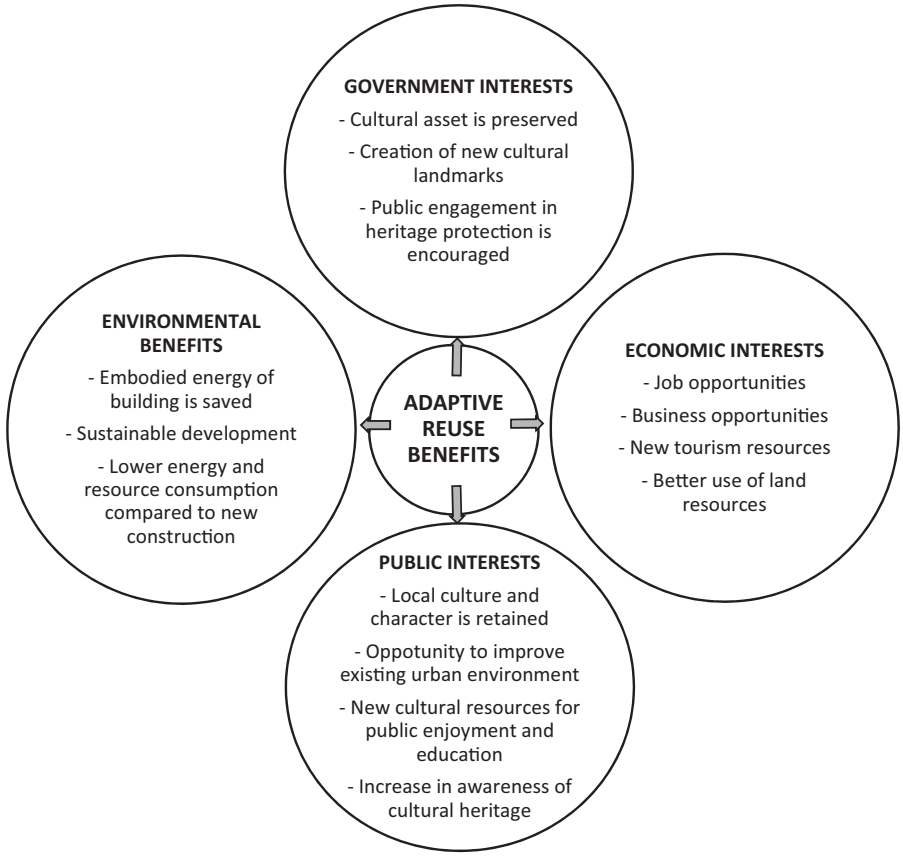

Figure 8. Benefits of adapting built heritage (Adapted from RICHES 2016).

Table 2. Analysis of ANM adaptive reuse (Developed by Authors).

Criteria	Description		
Ownership status	Private	Private	Public
Owner	Al-Saad Bassili Pasha	United States government	The Ministry of Culture
Old vs new building use	Residential Villa	American Consulate	Alexandria National Museum
Entity responsible for conservation		Ministry of Culture (Public sector).	
Collaboration type	Public procurement with the relevant private sector companies/individuals.		
New functions & activities	• Administrative functions, sales centre, and multi-media room arranged on both sides of the main entrance. • The basement level features artefacts from the Pharaonic period. • The ground level features artefacts from the Greco-Roman period in addition to recent underwater excavations. • The upper level floor features Coptic, Islamic and modern artefacts. • High-tech restoration laboratory for antiquities and electronic security system to preserve them. • Audio-visual workshop in the hall in the basement in which visitors can tour the museum via computer programs that display every item in the museum from a variety of angles. • The old garage for the American Consulate's staff has been converted into a lecture hall and an open-air theater for evening performances (Elsorady 2014).		
Benefits of employing adaptive reuse	According to Elsorady (2014), the adaptive reuse of this villa into a museum had several benefits including: **Functional Benefits:** • The new layout with its showcases have not interfered with the original setting and decor of the building. • Preserved building heritage values, authenticity and identity • Use has been made of every available space. • Efficient use for under-utilized building. **Environmental Benefits:** • Environmental benefits from sustaining and reusing the building. • Preserved building embodied energy **Economic benefits:** • Promoted visitors, and thus revenues • Providing jobs		
Limitations/Issues	• Lack of community/stakeholders' participation and consultation in the adaptive reuse process.		

Case study background

Due to the public ownership and historic value of this listed building, it was restored and adaptively reused. The Alexandria National Museum (ANM) was previously owned by Al-Saad Bassili Pasha. The villa reflects Alexandria's rich cultural heritage and cosmopolitan character. It was a gathering place for the upper-class Egyptian society in the city until the mid-1950s. Ownership was transferred in 1960 to the United States government to use it as an American Consulate. The Ministry of Culture bought it later from the US government for the purpose of converting it into a national museum. The basic design concept was to keep the main villa, to design a garden around it, and to maintain subsidiary service structures (see Figure 9 and 10) (Elsorady 2014).

Status: Preserved and adapted to a museum.

Figure 9. Exterior facade of ANM (Goddio 2019).

Figure 10. Interior museum displays of ANM (Goddio 2019).

Case study analysis

Table 2 illustrates the case study analysis of ANM including ownership status, old and new building function as well as benefits of employing adaptive reuse as a strategy for conservation.

Risks associated with adaptive reuse of heritage buildings

Despite the many benefits of adaptive reuse of heritage buildings, it is considered a strategy which presents a serious challenge for governments, architects and developers. On the side of architects/developers, they should try to gain insight into the value of heritage building to be reused and why it has a heritage status and in turn pursue adaptive reuse that would have minimal impact on the built heritage significance, values and setting (DEH 2004). A recurring issue that building owners, developers and designers will face is whether to adapt or demolish existing buildings (Reyers and Mansfield 2001; Bullen and Love 2010). Most commonly, developers and investors base their adaptive reuse decisions on perceptions instead of an objective assessment of risk (Bullen and Love 2011b). These perceptions are typically based on financial and economic decisions. According to Reyers and Mansfield (2001), the objective assessment of risks helps in alleviating their impact. Thus, an in-depth literature review was conducted to identify the risks that could be encountered in the adaptive reuse of heritage buildings (see Table 3), supported by case studies (see Adaptive reuse risks of heritage buildings: case studies analysis). These risks were classified into eight main categories (see Figure 11).

The previous table shows the degree of complexity and multiple interrelated decisions and risks associated with adaptive reuse of heritage buildings, which requires an interdisciplinary approach while dealing with their caretaking and management

Table 3 . Risks of adaptive reuse of heritage buildings (Developed by Authors. Adapted from Mahmoud et al. 2018).

No.	Category	Risk	Brief description	Case study
1	**Functional**	**Physical restrictions**	Existing floor layouts and size, number of columns/walls and structural system layouts (Wilkinson et al. 2014; Silva and Perera 2017). Such restrictions affect building adaptability to changing spatial needs, making it less flexible in spatial reconfiguration (poor spatial quality), consequently requiring costly refits to accommodate those needs (Bullen and Love 2011b; Wilkinson et al. 2014).	1
2		**Functional & physical obsolescence**	Functional obsolescence occurs when buildings are no longer adequate for the functions that they were essentially designed for (Rozzo and Mignosa 2013). Physical obsolescence refers to the deterioration of the structure, installations, or the façade of buildings so that they are no longer capable of supporting their functions (Rozzo and Mignosa 2013). The physical characteristics of buildings determine to a large extent the viability of adaptation (Wilkinson et al. 2014). For example, a building with a structural frame of poor physical condition would require extensive works to adapt, affecting economic viability, unlike a frame in sound condition (Wilkinson et al. 2014). Additionally, a building with outdated amenities and technology would be harder to adapt to contemporary needs (Azizi et al. 2016). Thus, the demand for these kinds of buildings is reduced, ultimately leading to economic obsolescence.	1, 2, 3
3	**Economic**	**Direct & indirect costs of conservation**	Several assumptions are made in an adaptive reuse project which increase provisional and contingency costs due to the incomplete design information, which is the case in most conservation projects (Reyers and Mansfield 2001; Azizi et al. 2016). This adds up to the direct cost of conservation, which is usually initially high in conservation projects.	–
4		**Economic obsolescence**	Economic obsolescence happens when it is no longer profitable to keep operating a building for its original purposes because the land on which it sits has increased in value (Rozzo and Mignosa 2013). It could be due to physical obsolescence and/or that the location of the building land is high in value, leading to economic pressures to favour newer developments that could optimize the land's potential better. A typical example is demolishing heritage villas to use the land for residential towers or office buildings (Azizi et al. 2016).	1

(*continued*)

Table 3 Continued.

No.	Category	Risk	Brief description	Case study
5		**Lack of business opportunity**	Lack of compensation and incentive schemes offered by the government. In countries other than Egypt, businesses obtain a tax relief when buying historical property as compensation for saving heritage, thus attracting investors to put money in such properties (Nader 2016). Moreover, the financial stakes are generally high in conservation projects. Therefore, unless the right support is offered, the project is unattractive from a business point of view (Azizi et al. 2016).	1
6	**Social**	**Financial and technical perceptions**	The notion that heritage buildings are old and inefficient, thus adaptively reusing them is useless and costly. Accordingly, demolition and rebuilding is regarded as a more attractive investment providing reasonable profits (Bullen and Love 2011b; Silva and Perera 2017).	1
7		**Lack of awareness of adaptive reuse opportunities**	Lack of awareness of the owners and general public of adaptive reuse could lead to the misconception that it is not a strategy that could generate benefits on social, economic and environmental levels (Silva and Perera 2017). Additionally, the scarcity of successful adaptive reuse projects, especially in the context of developing countries, contributes to this misconception (Said and Borg 2017).	1
8		**Lack of awareness of value of heritage**	Under appreciation of heritage and the misconception that heritage buildings are of no value, possess limited useful life, and hinder the modernization process. This is generally caused due to lack of proper education and it often leads to vandalism and demolition (Gharib 2009; Bullen and Love 2011b; Khodeir et al. 2016; Said and Borg 2017).	1, 2
9		**Limited response to sustainability agenda**	Limited support received from building owners and commercial property markets to make buildings sustainable and energy-efficient through reuse (Silva and Perera 2017).	4
10		**Miscommunication between conservation team members**	Poor communication and conflicting conservation philosophies and techniques, which could be a result of a lack of standard methods of conservation, confusing guidelines as well as poor knowledge of professionals (Azizi et al. 2016). Miscommunication could also occur due to differences in areas of expertize between professionals in addition to the lines of communication between professionals, craftsmen and general labourers (Reyers and Mansfield 2001).	4
11	**Technical**	**Non-availability of materials**	There is a necessity to use authentic materials or components in conservation projects which may be limited in availability and/or expensive (Reyers and Mansfield 2001). This may result in the use of new materials which may be incompatible with existing materials, affecting the authenticity of the structure (Azizi et al. 2016; Silva and Perera 2017).	4
12		**Lack of skilled tradesmen**	Shortage of local workers skilled in conservation work as well as unfamiliarity of tradesmen with older materials (Azizi et al. 2016; Silva and Perera 2017). The lack of conservation skills available for the repair and maintenance of historic architecture can result in conservation works done by inexperienced workers consequently causing problems to emerge afterwards on aesthetic and technical levels (Azizi et al. 2016).	4
13		**Maintenance issues**	In some instances, the fabric and structure of the building may have deteriorated to a point where high levels of maintenance and repair are needed to adapt the building successfully. This can affect the building usage and efficiency, as well as dealing with incurring continuous high costs for regular maintenance and repair (Bullen and Love 2011b).	2, 3
14		**Lack and inaccuracy of information and drawings**	The process of adaptive reuse involves a detailed assessment (sometimes opening-up works) of the building's physical attributes such as structure and fabric (Bullen and Love 2011b). Lack of accurate information on the structure could lead to the discovery of latent problems such as defects in structure or dimensional and material inconsistencies, which can affect the judgement about the necessary repairs and consequently, the safety of the structure. This could affect the likelihood of the success of adaptive reuse and increase additional costs considerably (Bullen and Love 2011b; Azizi et al. 2016).	4
15		**Complexity and technical difficulties**	Complexity occurs because older buildings typically are not equipped with access ways and adequate room enough to add contemporary services such as air-conditioning (Bullen and Love 2011b). Refurbishment techniques, technical installations and innovative solutions are thus required to convert a building to a new use within the constraints inflicted upon the contractor and design team (Silva and Perera 2017).	3
16		**Lack of knowledge of building professionals**	Issues in heritage building conservation can arise due to poor knowledge of organizations responsible for the conservation and maintenance of such buildings, leading to premature loss of valuable historic fabric. This lack of knowledge among building professionals could be traced to failure to differentiate their approach regarding modern and old buildings, which usually leads to decisions on conservation strategy and repairs without having an appropriate level of information (Azizi et al. 2016).	4
17	**Political**	**Lack of political will to conserve heritage**	This issue can be traced to political and economic instability such as what happened after the 2011 revolution in Egypt, which shifted the focus of the government to more pressing matters other than conservation.	1, 2, 4

(*continued*)

Table 3 Continued.

No.	Category	Risk	Brief description	Case study
			Heritage conservation is being viewed more as a luxury rather than a necessity in this climate (Said and Borg 2017).	
18		**Revolutions**	Revolutions can lead to acts of vandalism and destruction of heritage. Additionally, the instability of the country (Egypt) due to revolutions led to the reduction of the budget designated for heritage conservation and tourism as well as postponing renovation works and adaptive reuse projects of heritage buildings (El-Aref 2015; Said and Borg 2017).	3
19		**Lack of top management support and commitment**	Lack of sound communication between local community (as stakeholders affected by decisions taken) and top management (governmental authorities) responsible for heritage, with disregard of their potential participation in any actions in heritage areas (Gharib 2009; Said and Borg 2017). Additionally, there is limited support and compensation for investors and citizens to adapt heritage buildings (Nader 2016).	3
20		**Conflict of authorities**	Bureaucracy and ambiguity of who is responsible for what (Said and Borg 2017). Poor cultural and heritage institutions, disagreement over specialties, and lack of coordination (MPMAR 2016) as well as multiplicity of overlapping authorities in charge of historic areas and buildings (Gharib 2009). This conflict eventually led to the inefficient conservation planning of the heritage building inventory in Egypt.	2
21	**Financial**	**Commercial risk and uncertainty**	Contractors may be unwilling to adapt heritage buildings because of the perception that it is risky due to the possibility of a lengthy and difficult reuse process, which might lead to reduced profits. This idea is often related to several risks that may arise during this process such as: unknown work, materials compatibility, design constraints and decanting of occupants (Bullen and Love 2011b).	2
22		**High remediation costs and construction delays**	The discovery of hazardous materials during the adaptive reuse process can result in contamination in buildings, which would require additional costs to remediate and pose time delays (Silva and Perera 2017). Additionally, severe deterioration of the structure and fabric is also a factor that contributes to the requirement of extensive sums of money to rehabilitate the building. Such issues cause the building to be less attractive as an investment to owners/developers (Bullen and Love 2010).	2, 3, 4
23		**Lack of financial resources**	Conservation projects can be quite capital intensive and risky (Macdonald 2011). Due to the unpredictable nature of conservation work, the final cost of conservation projects is often difficult to ascertain. Thus, the financial aspect is a major determinant to property owners, developers and even governmental authorities especially if the building condition is deteriorated (El-Aref 2015; Azizi et al. 2016). In Egypt, financial allocations are not proportionate to the size of heritage sites which require conservation, consequently limiting the number of projects that can be conducted at a given time (MPMAR 2016).	1, 2
24	**Legal**	**Classification (Zoning) change**	Scope and classification changes of buildings through adaptive reuse may result in zoning changes which requires complying with new building codes (Bullen and Love 2011b). This presents a challenge for developers and architects to deal with new innovative solutions to upgrade buildings (Bullen and Love 2011b), as well as the challenge to deal with the authorities to provide the necessary permits for the proposed new building use.	–
25		**Building codes and regulations/legal constraints**	Requirement of complying with current building codes, regulations, conservation guidelines, licensing and planning requirements (Silva and Perera 2017). Additionally, confusing/weak laws and inconsistent regulations and standards from advisory bodies and professional institutions could hinder the decision making process (Reyers and Mansfield 2001) and thus could lead to the inappropriate renovation/ alteration of heritage buildings (Azizi et al. 2016). Such issues pose restraints on private entities, such as developers and owners, to adapt heritage buildings smoothly.	1, 2, 4
26	**Environmental**	**Hazardous materials**	An older building carries a higher risk to hazardous materials when carrying out inspection before adapting the building, such as asbestos and lead. Such materials affect the health and safety of workers and take longer time to deal with if discovered, causing delays (Department for Environment and Heritage 2008).	–
27		**Threat of ground water table**	High levels of underground water can seep into the foundations of the structure, thus affecting its stability and safety (Gharib 2009). Eventually, the building may collapse if not repaired.	3

(Bullen and Love 2011b). This approach should include issues of architecture, conservation, engineering and planning along with the relevant professionals in those fields (Macdonald 2011; Plevoets and Cleempoel 2011; Hegazy 2015). Accordingly, ADFs and developers specialized in heritage building conservation (as a private sector entity) employ the above-mentioned disciplines, which could support the GOE in managing adaptive reuse risks through a PPP between both sectors. The next section will be explaining in further detail the concept of PPP for heritage conservation.

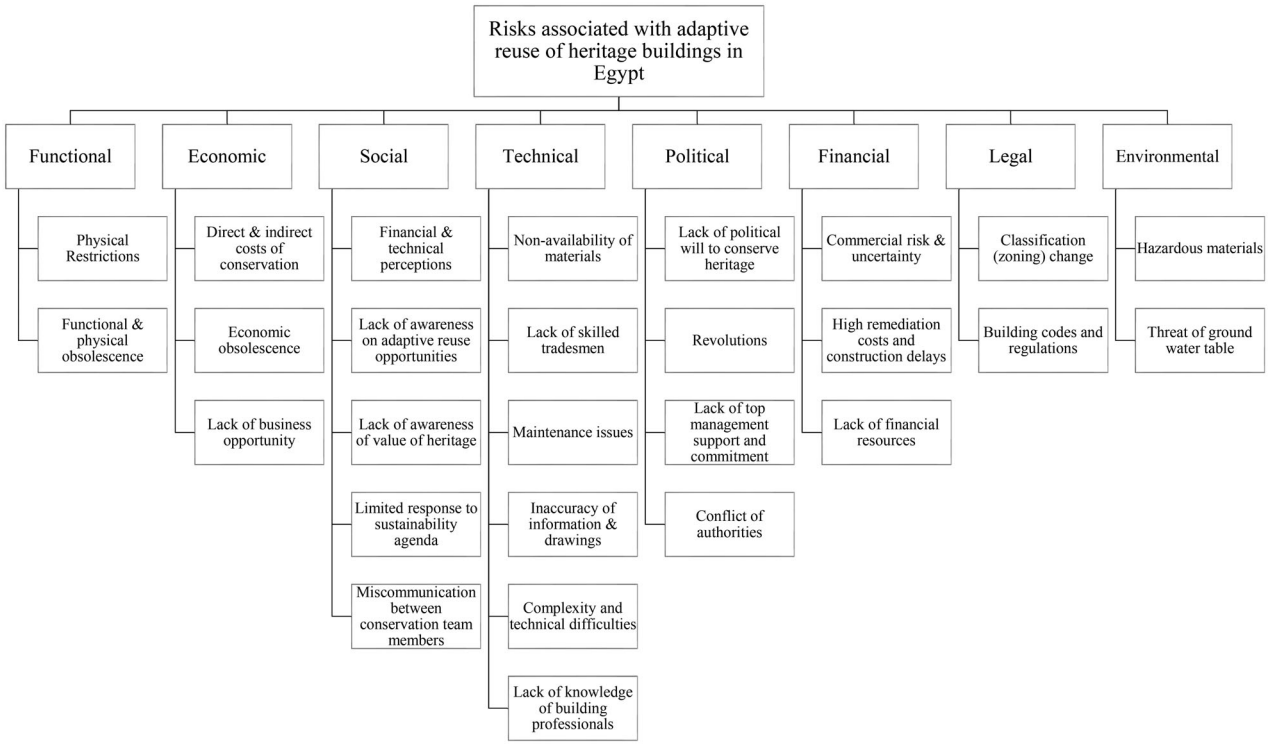

Figure 11. Categories of adaptive reuse risks of heritage buildings in Egypt (Developed by Authors).

Public-private partnerships

Definition and background

The National Council for Public-Private Partnerships (NCPPP) (2010) (as cited in Macdonald 2011) defined a PPP as "a contractual agreement between a public agency and a private sector entity. Through this agreement, the skills and assets of each sector are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility". PPPs focus on sharing three core "R's", which are resources, responsibilities and risks (RICHES 2016), which makes them different from service contracts and privatization (Macdonald and Cheong 2014). PPPs are traditionally used as a means to deliver public services and infrastructure projects such as transportation, energy, telecommunications and housing. They can be utilized to fill the gap between the demand for public services and governments' willingness or ability to pay for them (Macdonald 2011).

PPPs for heritage conservation

Since late 1960s, PPPs were used for heritage conservation within the context of urban regeneration schemes, which slowly expanded to include the management and conservation of areas of heritage significance (Macdonald 2011). It is worthy to note that not even in the richest of countries does the public sector possess adequate financial resources for the ownership, rehabilitation, and maintenance of all heritage buildings requiring preservation. While in various countries the third sector has developed expertize in education and heritage activism, seldom do these organizations have the necessary capital or the development expertize to adapt and renovate heritage buildings. Consequently, the private sector often has a main role in the revitalization and ongoing maintenance of heritage buildings (PPP Knowledge Lab 2019).

Figure 12. Parador de Corias, Asturias, Spain (The Telegraph 2019).

PPPs have offered a promising new approach whether for financing, developing, operating, and/or maintaining heritage buildings. Heritage conservation PPPs usually include adaptive reuse, in order to turn underutilized structures into a new more useful function such as museums, community centres, or even commercial uses. Additionally, heritage PPPs can also transform abandoned heritage buildings into hotels, as seen with Spain's "paradors" or also known as castle-hotels (see Figures 12 and 13), which have changed heritage sites into luxury accommodations (see also section 5.7).

Table 4 explains some types of PPPs and the corresponding types adapted for conservation. Each type is illustrated according to the level and extent of intervention of the private sector, ranging from types that are close to privatization (BCO) and others that enable the heritage asset to be in government ownership.

PPPs for heritage conservation projects are dynamic and usually long-term transactional contracts between the public and private sectors, where they share the 3 "R's" stated previously. However, there are many heritage alliances that are being described as PPPs but lack in any sharing of risk or transaction

Figure 13. Parador de Santiago de Compostela, Galicia, Spain (The Telegraph 2019).

Table 4. PPPs delivery types adapted for conservation of heritage buildings (Adapted from Macdonald and Cheong 2014).

PPPs type as adapted to conservation	Description of the PPP type
Buy-Build Operate (BBO) or Buy-Conserve-Operate (BCO)	Closest to privatization. Private sector purchases the heritage asset outright with strict requirements such as maintenance standards. Government protects heritage asset and specifies standards of conservation and maintenance.
Build-Operate-Transfer (BOT) or Build/Conserve-Operate-Transfer (B/COT)	Private sector is responsible for conserving, operating and managing the historic structure through a long-term lease. The government remains highly involved in the project's design and development to ensure that the structures' historic attributes remain available to the public.
Build-Lease-Operate-Transfer (BLOT) or Build/Conserve-Lease-Operate-Transfer (B/CLOT)	The long-term lease addresses the conservation expectations of the project, clearly specifying who has responsibility for maintaining the building's cultural significance and detailing the approval process for any changes and allowance for public inspection of the building. Ownership and all responsibilities are transferred back to the public sector after the terms of the lease have been fulfilled.
Design-Build-Finance-Operate (DBFO) or Conserve-Build-Finance-Operate (CBFO)	The private sector is responsible for the conservation of historic assets, the construction or addition of new structures and the financing and operation of both.
Finance Only	Project funded directly by private sector or uses long-term leases or bonds.
Operational License	Private or third sector operates a service under contract or license at the heritage asset for a fixed term. The heritage asset remains in government ownership.

between parties. In the heritage industry, most of these alliances work as tourism marketing or promotional partnerships, in order to raise funds or encourage tourist visitation. Other sorts of interactions between the public and private sectors which are not considered as true conservation PPPs include eminent domain, "where government seizes a property and compensates the owner", in addition to public procurement or projects where the public sector contracts with private developers for a service. The last type is regarded as a one-sided contract in which the public sector bears most of the risks and investment (Macdonald 2011).

Roles and responsibilities in PPPs

There are multiple sectors involved in PPPs. Those sectors are: public, private and third sector. The public sector comprises governmental bodies, the private sector comprises business and investor organizations or individuals, and the third sector includes NGOs and may also include members of the community. Each sector carries out a fundamental role within such partnership, complimenting the role of the other sectors. However, in this paper, the primary two parties in the partnership agreement would comprise of the public sector and private sector. The third sector role is crucial, yet it will be regarded as a tertiary party. The private sector usually provides capital, technical skills, project delivery and long-term management of the project. The public sector typically provides the asset, regulatory framework, standards and guidelines of heritage conservation and protection as well as financial incentives to attract private investment. The third sector could raise public awareness and bring local knowledge and concerns in addition to protecting community interests (Macdonald 2011; Rypkema 2013). Table 5

Table 5. Responsibility of public and private sector in relation to PPP type (Developed by Authors).

PPP type	Operation and maintenance	Funding	Asset ownership
BCO	Private	Private	Private
B/COT	Private	Private	Private sector during contract, then transferred to public sector
CBFO	Private	Private	Public
Finance only	Public	Private	Public
Operational License	Private	Public	Public

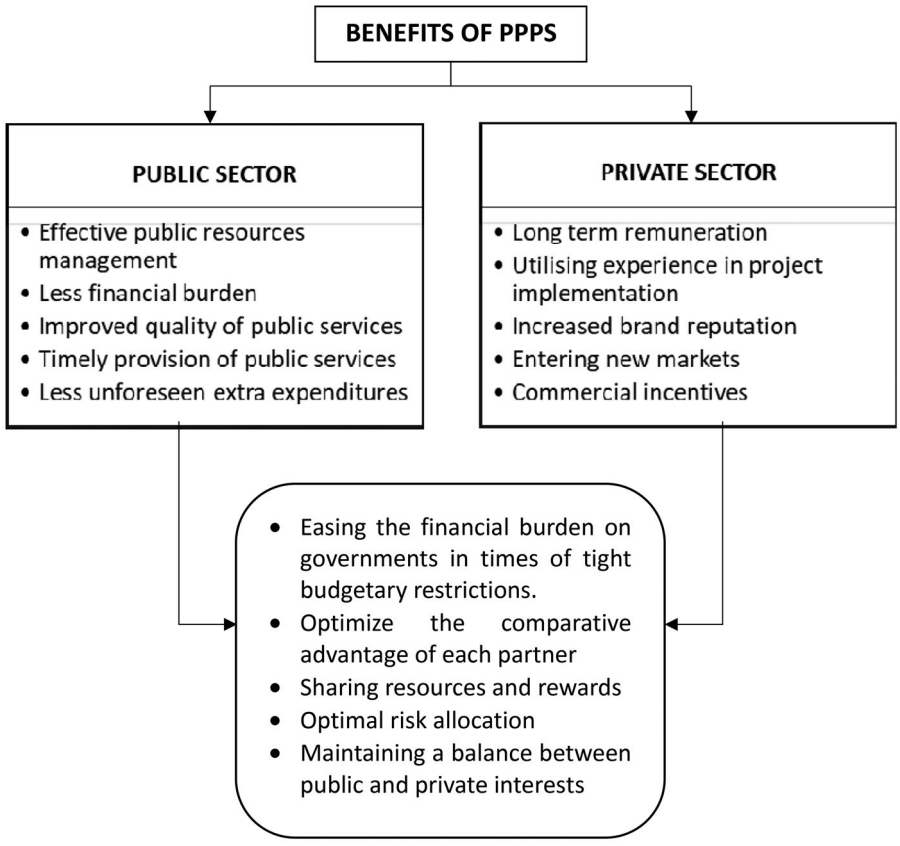

Figure 14. PPP benefits (Developed by Authors. Based on Ministry of Finance of the Republic of Lithuania 2015; Monreal and Hassan 2013).

illustrates the responsibilities held by the public and private sector in relation to PPP types discussed earlier, in terms of who holds responsibility for operation and maintenance of the asset, funding of the project and asset ownership.

Benefits of PPPs

There are several benefits for both the private and public sector from joining a PPP agreement. For the private sector, even though the financial return is a strong and principal driver (Badawi 2017), it is not the sole motivation as PPPs can provide other returns on investment in the form of increase in brand reputation, entering new markets and acquiring expertize (RICHES 2016). As for the public sector, a PPP with the private sector can reduce the financial burden on governments during times of budgetary restrictions, especially in less developed countries, where cultural heritage is vastly rich yet public resources are scarce (Monreal and Hassan 2013). The public sector can also benefit from the private sector's market knowledge and expertize in project implementation (Ministry of Finance of the Republic of Lithuania 2015). Figure 14 illustrates the benefit of PPPs for both the public and private sectors.

Issues/risks that could occur in PPPs for heritage conservation

Private/public sector willingness

Despite the ultimate premise of a PPP being that risks will be shared between both sectors; the private sector is not always willing to accept risks without the potential for significant returns. Therefore, in the light of minimizing risks, the private sector thus often demands contribution from the public sector in the form of grants, subsidies or guarantees. Failure to do so could result in limited 'saleability' or incentivization for the private sector to take on the project (Verma 2007). Risk of the private sector is not necessarily purely financial since it comprises risks of the project slowing down, or becoming more problematic to achieve due to complex government regulation (Macdonald and Cheong 2014). Accordingly, the public sector could assist in mitigating this risk by providing greater regulatory certainty through special frameworks to manage a project, thereby removing or simplifying some of the regulatory processes and coordinating complex processes across various government departments. PPPs for heritage conservation are also disadvantaged due to a time-honoured mistrust between both the private and public sectors, in addition to fears that private sector involvement can equate to privatization (Macdonald 2011).

Defining clear goals

Heritage conservation PPPs are similar to common large infrastructure projects in their complexity and long-term nature. Accordingly, partners in the agreement need to be transparent about their needs, goals and outcomes throughout the entire process, since needs are subject to change within this long-term project cycle, due to a change in governments or an economic downturn as what happened during the 2011 Revolution in Egypt as well as the flotation of the Egyptian Pound. However, transparent communication, flexibility and trust can help alleviate potential miscommunication and conflicts. This is particularly vital in heritage PPPs, where the goals and measures of success of both partners may be unalike (PPP Knowledge Lab 2019).

According to Macdonald (2011), private sector entities are generally looking for the presence of four key factors that could assist them in reducing risk in heritage conservation projects, those are:

1. "*Clarity* about the elements that are important and need conservation, the standards for conservation, the appropriate level of change, the areas that can be redeveloped, and the ways in which those areas can be developed".
2. "*Certainty* about the regulatory framework, how it will operate, and the time it will take to deal with the authorities".
3. "*Consistency* in the application of the regulations".
4. "*Consultation* and *open communication* between the public and private sectors".

Market demand and community/stakeholder approval

According to the PPP Knowledge Lab (2019), the main element of a successful heritage PPP lies in identifying the needs and demands of the market and that a heritage building is seldom renovated for a single use, where the majority of heritage conservation projects focus on a mix of different uses for a building according to market demand to alleviate the volatility of any particular use. In that sense, heritage conservation PPPs should be centred upon the recognition of the heritage building as a community asset (regardless of its ownership status), and thus recognize that stakeholder engagement is vital to the success of the partnership and also in order to prevent incidents of public scepticism towards such projects.

PPPs in Egypt

Egypt is one of the countries that witnessed some earlier and most successful PPP projects during the 19th century, more than a century before the emergence of the term PPP itself, where "the first successful modern BOT project was the Suez Canal, completed in 1869" (Kamel et al. 2017). In Egypt, as in many other countries, the public sector principally holds responsibility for supplying finance in the delivery of public facilities. Hence, governments usually resort to different means of finance after critical political and/or economic events due to the withdrawal of foreign capital. Therefore, governments may have no choice but to adopt untraditional financing schemes especially in case of budget deficit, which was the case with Egypt, where numerous projects were hampered as a result of lack of sufficient funds provided by the relevant authorities.

Unfortunately, Egypt's initial wave of PPP projects suffered from significant problems, causing some of them to encounter tangible losses, go to arbitration, convert to traditional project delivery methods, or even to be cancelled. Such issues occurred since the government announced and awarded those PPP projects without adequate study, comprehensive planning, an apt legal frame, and/or a proper awareness of government officials. Nevertheless, in 2006 the GOE created the Public Private Partnership Central Unit (PPPCU) in addition to enacting the PPP law and its executive regulations in 2010 and 2011 respectively in order to upsurge the likelihood of success for such projects. Unfortunately, the government's new serious measures were challenged by the political instability following the 2011 revolution which continued for more than three years. This caused a substantial negative impact on the PPP environment in Egypt (Kamel et al. 2017).

Presently, the political and economic environment is more stable and open to the PPP approach. The GOE realises that financing its mega projects is a major challenge which requires aid. Thus, Egypt Vision 2030 depends on various innovative tools, including PPPs, mainly directed at the financing of development and infrastructure projects. The strategy aims to incorporate and expand the investor base by attracting more private investors such as individuals and non-banking financial institutions to support the private sector participation with the public sector, understanding the crucial role of the national private sector in helping to achieve the strategy's targets. Furthermore, the strategy plans to offer incentives and use the BOT system (MPMAR 2016). As previously mentioned, the strategy is basically focused on infrastructure and development projects. However, it could be used as well for heritage conservation projects, such as adaptive reuse of heritage buildings (see the following case study).

Best practice case study: Tai-O Heritage Hotel, Hong Kong, China

Case study background

This case study discusses the adaptive reuse of a heritage building in China through PPP agreement and it is included in this research as a best practice study on PPP for adaptive reuse of heritage buildings. In order to formulate a sustainable conservation policy, the Hong Kong Government introduced the PPP based "Revitalising Historic Buildings through Partnership Scheme" (RHBTPS) to facilitate the adaptive reuse of government-owned historic buildings. The PPP approach was primarily used in order to "encourage the input of private investment and expertize in financing the revitalization of heritage buildings". The adaptation of Tai-O Police Station into Tai-O Heritage Hotel using the RHBTPS can be considered as a successful example of adaptive reuse, providing a range of benefits to the public and private sectors as well as the community. Figures 15 and 16 show the building before and after the adaptive reuse process.

Status: Preserved and adapted from a police station to a hotel.

Figure 15. Old Tai-O Police Station (Chung 2012).

Figure 16. Tai-O Heritage Hotel (Living Nomads 2017).

Case study analysis

Table 6 discusses the PPP type used in this case study to finance and rehabilitate the building and benefits of employing this partnership scheme.

Adaptive reuse risks of heritage buildings: case studies analysis

Objective, selection criteria and analysis aspects

Objective

This section analyses four case studies designated for the further understanding of adaptive reuse risks through real life examples in Egypt and developing countries.

Selection criteria

The criteria for selecting the case studies are based on the building type, heritage-listing, condition and ownership status (Table 7). The context would mainly be Egypt, but also a case study in a developing country that is similar to Egypt in terms of social, economic and environmental aspects was chosen to compare between both contexts.

Table 6. Tai-O heritage hotel adaptation (Developed by Authors. Based on Chung 2012).

	Description
Type of PPP	The RHBTPS can be classified as a modified BOT type of PPP. This scheme goes as follows: in this case, an NGO will "build" (renovate) and "operate" the building throughout a fixed concession period under an agreement, and finally "transfer" it to the government after the expiry of the agreement.
Benefits of the scheme	• **Administrative** • Allowing the private sector to adapt and operate the heritage building, which in turn allowed the public agencies to focus on its main competencies. • Wider range of resources and skills were added to the project through the private sector as well as balancing the concerns and limitations between urban development and conservation. • Minimising the project risks through the sharing/risk allocation between sectors. • **Social** • The scheme brought a new life to the old station, preserving it as a historic/cultural landmark in the local community. • The adapted heritage building serves as a touristic attraction, displaying the history of Tai-O village and the police station. • **Economic** • Economic growth, investment and employment opportunities were enhanced during the conservation process and upon the completion of the project. • The revenue generated from the hotel accommodation services and local tours is used for the ongoing maintenance of the heritage building. • **Cultural** • The scheme helped in the preservation of the unique architectural characteristics of the station. • Through the conversion of the station into a hotel, the original building fabric was maintained in its original state. • The surrounding landscape and natural vegetation around the station were preserved.

Table 7. Case studies selection criteria (Developed by Authors).

Criteria	Description
Building type	Heritage
Building age	Unspecified
Heritage listing	Listed
Ownership	Government-owned or private entities/individuals
Country/Region	Egypt, developing countries in the MENA region

Analysis aspects

Goodrick (2014) defined a case study as "an in-depth examination, often undertaken over time, of a single case – such as a policy, programme, intervention site, implementation process or participant". Creswell (2003, as cited in Zainal 2007) suggested the structure of a case study should be the problem, the context, the issues, and the lessons learned, or patterns found that connect with theories. Based on Creswell's suggested structure, the case studies would all share the same problem, which is an under-utilized building condition. The context would be as stated in the previous section. The issues would be the risks associated with adaptive reuse collected in the literature review that eventually led to the current building condition and finally, the lessons learned would be collected at the end of the case studies section in a comparative analysis mode. This analysis would help in the comprehension and conception of which partner in a PPP could aid in alleviating the previously mentioned risks.

Figure 17. Durrell's Tower (Miller 2010).

Figure 18. Exterior of Villa Ambron (Shalabi 2017).

Table 8. Adaptive reuse risks of Villa Ambron (Developed by Authors).

Risk	Description
Functional	Due to its *functional and physical obsolescence*, the developer who purchased the villa purposefully damaged it from the inside so that it would fall down and become delisted as heritage (Spencer 2013). The *physical restrictions* due to the size and number of floors of the villa were conflicting with the developer's interests. The developer consequently demolished the villa, despite the protests of NGOs and the residents of the area, in order to build a high rise residential tower (Spencer 2013).
Economic	*The lack of business opportunity* of this kind of heritage in the Egyptian context and *the economic obsolescence* of the villa led the developer to demolish the building in favour of new development. Alexandria is a linear city, cramped between the Mediterranean in the north and Mariout Lake in the south. Thus, the space that is available to build on is extremely limited, making real estate investment very profitable, leading to demolition of older buildings, whether heritage or non-heritage (Said and Borg 2017; Shalabi 2017).
Social	*Social consideration* of residents and people who were intangibly attached to the villa and to the heritage of Alexandria such as tour guides, architects, historians, local activists, preservationists, and other Alexandrians (Spencer 2013; Shalabi 2017). Many people in Alexandria, and around the world, were attached to this villa since it was where Laurence Durrell the novelist, wrote his "Alexandria Quartet" (Miller 2010). *Financial and technical perception* of the developer that demolition and new development are more profitable and less expensive than adaptive reuse.
Political	*Lack of political will to conserve the heritage villa* since local authorities did not protect the building from demolition despite objections to the demolition plans by local activists, preservationists, and other Alexandrians in addition to attempts to gather funds to purchase the property (Shalabi 2017).
Financial	*Lack of financial resources* to purchase the building by preservationists and local activists from the owner as well as lack of financial support from the local authorities led to the loss of the opportunity of adaptation and loss of the building altogether (Shalabi 2017).
Legal	Heritage *building regulations and laws* are not strong enough due to loopholes in the legal framework for the demolition of heritage buildings, whereby developers find ways to circumvent existing laws (Shalabi 2017). Consequently, the developer was able to obtain judicial approval from the local courts to demolish the property, although it was listed as a heritage building (Spencer 2013; Shalabi 2017).

Case study 1: Villa Ambron, Alexandria, Egypt

Case study background and problem

Villa Ambron was one of the most distinguished buildings in Alexandria's cultural life with its belle époque architecture. It was built and owned by architect Aldo Ambron in 1920 and the house has been home to dignitaries including Italy's exiled king Vittorio Emanuele III and Lawrence Durrell, the British novelist, where he was inspired to write his 'Alexandria Quartet' in the villa's tower (see Figure 17). The Ambron family sold the house in 1996 to a local developer, who built two apartment blocks in the villa's garden and neglected the villa to the point of extreme deterioration, eventually demolishing it (see Figure 18).

Status: Demolished.

Case study analysis

Table 8 summarizes and analyses the risks of adaptively reusing the villa, that eventually led to its demolition.

Case study 2: Ismail Siddiq El-Mufatesh Palace, Cairo, Egypt

Case study background and problem

The Ismail Siddiq Pasha El-Mufatesh Palace, built in 1866, is registered as a historic Islamic monument under the Ministerial decree number 14 for the year 1986. It was constructed in Lazoughli square by Ismail El-Mufatesh, minister of finance during the reign of Khedive Ismail (El-Aref 1998). The building has been used as Ministry of Antiquities Projects Sector quarters for a while for administrative functions (El-Nagar 2015). The usage of heritage government-owned buildings by governmental authorities as administrative buildings and not as buildings that constitute a part of national heritage is part of the reason that led to the deteriorated state of this palace (see Figures 19 and 20).

Status: Partly demolished, deteriorated condition. Still under restoration.

Case study analysis

Table 9 illustrates risks associated with adapting the palace to a new use.

Figure 19. Inside Ismail El-Mufatesh Palace (Abdelmeguid 2016).

Figure 20. Exterior façade of Ismail El-Mufatesh Palace (Abdelmeguid 2016).

Case study 3: Zaghloul Mosque, Rosetta, El Beheira, Egypt

Case study background and problem

Zaghloul Mosque was built around the 16th century and it is located in the southern part of Rosetta in Egypt. It is listed in the Register of Islamic and Coptic monuments (Mansour 2018) and is considered one of the largest and oldest mosques in Rosetta, dating back to the Egypt's Circassian Mameluke period (see Figure 21 and 22), where it was a hub for scientific, national and religious movement (El-Aref 20182018). From this mosque, resistance

Table 9. Adaptive reuse risks of Ismail Siddiq El-Mufatesh Palace (Developed by Authors).

Risk	Description
Functional	*Functional and physical obsolescence* of the palace due to its extremely deteriorated condition as well as the disruption of its plumbing system (Abdelmeguid 2016).
Economic	*Economic obsolescence* as a result of the building being functionally and physically obsolete for a long period of time, in addition to the absence of up-to-date technologies and contemporary retrofits.
Social	*The lack of awareness of the value of heritage* is apparent on this case study. Adding to the negligence of the maintenance of the palace, it has been used in administrative functions by the Ministry of Antiquities, which were not compatible with neither its form nor deteriorating state (Abdelmeguid 2016).
Technical	The amount of *maintenance issues* in the building is caused by its extreme deterioration due to years of neglect. A water pipe broke in the plumbing system of the palace, resulting in water leakage to the walls which eventually seeped into the foundations. This leakage caused cracks in the walls as well as the collapse of parts of them, which would require substantial sums of money to repair (El-Nagar 2015; Abdelmeguid 2016).
Political	*The lack of political will to conserve* heritage led to this current status of the building, despite it being listed as a historic structure. The fact that the renovation works were assigned to contractors since 2002 and still the palace is deteriorating, indicates the lack of such a political will to act (El-Nagar 2015; Abdelmeguid 2016). *Conflict of authorities* and ambiguity of who is responsible for the current state of the palace, in addition to the lack of coordination between the responsible authorities to safeguard the heritage asset (Abdelmeguid 2016).
Financial	*Lack of sufficient financial resources* as well as the wastage of the assigned budget by the contracting company contributed to the factors affecting the current status of the building (Abdelmeguid 2016). *Construction delay* eventually led to extremely *high remediation cost*, where the initial budget for the renovation works was 62 million Egyptian pounds in 2002, eventually increasing to reach 200 million, and the renovation is still not completed (Abdelmeguid 2016). *Commercial risk and uncertainty* due to the lengthy and unfruitful renovation process of this palace, given that it is not even known whether the building will be adapted to a new profitable and compatible use or not.
Legal	*The weak implementation of laws and legislations* regarding historic and heritage structures had quite an immense negative impact on this palace. Non-compliance of the authorities with *building codes and regulations*, including conservation guidelines, since the building is being used in administrative functions that are not compatible with its historic status and its physical condition, where several of the employees in the building complained of the safety of the structure (El-Nagar 2015).
Environmental	*Threat of rising ground water table* to destroy the foundation due to the poor plumbing system that seeped water through the structure.

Figure 21. Inside Zaghloul Mosque, showing restoration of columns (Mansour 2018).

Figure 22. Roof of Zaghloul Mosque, showing the unique architectural style and poor condition of domes (Abudeif and Hefny 2018).

against Fraser campaign was initiated in 1807. However, time and negligence took a toll on the structure. The building is still under restoration by governmental authorities (Mansour 2018).

Status: Preserved, still under restoration.

Case study analysis

Table 10 shows the risks associated with the adaptation of this historic structure. It is worthy to note that, although the building is being adapted to suit contemporary needs, the building lacks a function that would make the preservation and protection of the structure sustainable. The Mosque is being restored for the same function (that is, worshiping) and indeed it has immense spiritual, historical and cultural values. However, there has been no clear plans on the addition of new functions/activities to generate revenues for the ongoing maintenance of the building. Since the purpose of such a building is completely sanctuary, the new activities should be compatible with the original purpose. Such activities could take place in the form of charity events, religious sermons and events in addition to Islamic religious educational activities for all ages.

Case study 4: the Omani-French Museum, Muscat, Oman

Case study background and problem

This case study was chosen as an example of adaptive reuse of a heritage building in a country similar to Egypt (Oman) - which is also very rich in heritage but lacks the necessary resources and skills to conserve them - in terms of social, economic and environmental context, to achieve reliable and relevant analysis results. The building was constructed between 1820 and 1840. It was initially dedicated as a consulate and a house, to the French consul Paul Ottavi around 1894, in traditional Omani Architecture, with influences from pre-Islamic architecture, symbolizing the friendship between France and Oman (see Figures 23 and 24). The building was adapted to become a museum to document all historical relationships between France and Oman as a means for its conservation (Hegazy 2015).

Status: Preserved and adapted from Bait Faransa (residential building and consulate) to a museum.

Case study analysis

Table 11 illustrates the issues and risks that arose in the adaptive reuse process of the Omani-French museum.

Table 10. Adaptive reuse risks of Zaghloul Mosque (Developed by Authors).

Risk	Description
Functional	*Functional and physical obsolescence* due to the extreme deterioration of the mosque along the years (abuse of the mosque by worshippers as well as the encroachment of traders over the centuries) (El-Aref 20182015).
Technical	*Complexity of the project, technical difficulties and maintenance issues* due to the extreme deterioration of its foundation caused by high subsoil water levels, high levels of humidity, and the leakage of water from the water fountain used for ablutions, as well as the city's decaying sewage system. Accordingly, the mosque had suffered serious cracks in its walls and ceilings and the floors had partially collapsed. Many of the original bricks used in the mosque's construction had decayed and lost some of their original features, impacting the authenticity of the historic structure (El-Aref 20182015).
Political	*Lack of top management support and commitment* to approve of the financial resources required for the building conservation, causing delays of the project, and the opening of only the first phase of the restoration works till this day (Abudeif and Hefny 2018). The restoration work of the Mosque began during the year 2005 and stopped during the *January 25 revolution* due to insecurity and poor economic situation in the country (El-Damanhoury 2018).
Financial	*Lack of financial resources* to complete the renovations prolonged the conservation process, where 7 years have been wasted completely out of 13 years of renovation and restoration works (Abudeif and Hefny 2018).
Environmental	A major preservation project was undertaken to raise the mosque foundation level to one meter above ground after the floor was submerged in rising *underground water* (El-Aref 2018).

Figure 23. Inner patio in the Omani-French Museum (Studio Persevoir 2016).

Figure 24. Exterior façade of the Omani-French Museum (David 2018).

Comparative analysis

In order to gain a better understanding of the case studies at hand, and the topic addressed in this research, a comparative analysis of the case studies was chosen as a method to understand similarities and differences between different contexts. The analysis will be based on a set of criteria, which are: the ownership status of the heritage building, and the risks associated with adaptive reuse identified earlier for each case study (see Table 12).

For the ownership status analysis aspect, table 12 shows that only the first case study (Villa Ambron) was privately owned. The rest of the cases were owned by governmental authorities. In that light, it is evident that a case that was owned by a private individual suffered from a different treatment when compared to a case that was publicly-owned. The building was treated by its owners as a burden regardless of its heritage-listing due to the associated risks of adaptive reuse. Consequently, it was found that demolishing the structure to build a residential tower was the more profitable and feasible solution from the owner's perspective. In the case of government-owned buildings, heritage buildings may suffer from decay and vacancy but are not subjected to demolition as long as they are heritage-listed structures. This indicates the need for governmental authorities to provide the right support to private owners of heritage buildings to renovate their buildings instead of resorting to demolition and redevelopment. As for the comparative analysis of risks, they will be presented below, where cases 1, 2 and 3 have been categorized as 'Egyptian Cases' and case 4 as 'Omani Case' for simplification purposes.

From table 12, it is found that the Egyptian and Omani cases share social, technical, political, financial, legal and environmental risks, but not functional nor economic. The similarities can be summarized in the following:

- **Political risk**, related to the lack of political will to conserve heritage, where the relevant authorities in both Egyptian and Omani cases did not provide the adequate top management support and commitment to conserve the buildings.
- **Legal risk**, where the lack of a clear and sound conservation policy and regulations caused ambiguity and delay in the conservation process in the Omani case and deterioration and also delay in the Egyptian cases.
- **Financial risk**, where both contexts suffered from high remediation costs due to delays and incorrect renovation works that had to be redone. However, in the Egyptian cases, the lack of financial resources was a more prominent issue for delay.
- **Environmental risk**, where the Omani case and two of the Egyptian Cases (Cases 2 and 3) suffered from rise in underground water table that affected the structural stability of buildings.
- **Social** and **technical risks** in the Egyptian and Omani cases were present, but slightly different in nature. In the Omani case, the social risks related more to miscommunication between building professionals and their degree of knowledge and response to sustainability and contemporary

Table 11. Adaptive reuse risks of The Omani-French Museum (Developed by Authors, based on Hegazy 2015).

Risk	Description
Social	*Miscommunication between conservation team members* due to the absence of some of the members in the required team of professionals, which resulted in a lack of knowledge in some areas, consequently reflecting negatively on the conservation process. *Limited response to sustainability agenda* since the inner patio (see Figure 21) was left exposed to the open sky regardless of the severe climatic conditions of Muscat, which resulted in reduced level of comfort for the users. A request was sent by the museum's curator to the Department of Museums in the Ministry of Heritage & Culture to cover the patio in addition to the need of a glass door next to the outer wooden door because it is always kept open during work hours. *Lack of knowledge of building professionals* in their strategy to deal with the authentic materials and visual appearance of the structure. The response to the request mentioned in the previous point was met without any consideration to the existing traditional materials; aluminium sections and glass were utilized which adversely affected the visual appearance. The problem could have been avoided if there was a consultant architect among the conservation team members.
Technical	There was a *lack of skilled tradesmen* such as a master craft worker in the project team. This might have led to incompatibility in using materials and restoration of specific elements (such as wooden windows) that reflect the building's vernacular Omani Architecture. *Inaccuracy of information* related to the foundation of the building resulted in the unnecessary addition of galvanized steel to strengthen the structure system during the conservation process, even though it could carry ten times the existing load. Consequently, when water crept through the structure system as a result of the increased underground water level, it led to iron corrosion, increasing the iron thickness and subsequently causing cracks in the plastering of columns.
Political	*Lack of political will to conserve heritage* is apparent in the non-participation and commitment of all the required responsible governmental institutions at several points during the conservation process.
Financial	*High re-mediation costs* due to inadequate conservation methods used in the previous conservation process, which led to the incurring of additional costs for an additional re-upgrading process after only 3 years of the initial process. Additionally, the new solution adopted required annual maintenance.
Legal	*The lack of proper planning policy, legislations and decision-making* between required parties caused *confusion and ambiguity* in the adaptive reuse process and affected the safety of the building. The absence of a town planner in the process resulted in lack of precautions related to location planning, since later on heavy machines were used to pave a new road adjacent to the museum, resulting in vibrations which affected the beams and the flooring.
Environmental	*Threat of groundwater table* due to the absence of a historic garden engineer in the adaptation process, which resulted in the over usage of green areas around the building, instead of selecting special types of greenery which do not need consistent irrigation. Eventually, the daily irrigation affected the building foundations and walls.

Table 12. Comparative analysis of case studies (Developed by Authors).

	Analysis Aspects	**Case 1**	Case 2	Case 3	Case 4
	Ownership Status	Private	Public	Public	Public
Risks	**Functional**	x	x	x	
	Economic	x	x		
	Social	x			x
	Technical		x	x	x
	Political	x	x	x	x
	Financial	x	x	x	x
	Legal	x	x		x
	Environmental		x	x	x

needs, since the project has already undergone an adaptive reuse process. For the Egyptian cases, social risks related more to community members and stakeholders involved and their lack of awareness of the value of heritage.

- As for **technical risks**, the Egyptian cases conveyed risks related to complexity of the project and maintenance issues due to deterioration, while the Omani case showed issues that arose during the adaptive reuse process due to lack of information and skilled tradesmen. This seems to indicate that various levels of risks of the same category could occur during the adaptive reuse process in different phases of the project. Perhaps a more elaborate classification of risks based on the adaptive reuse project phases could be an area for future research and analysis.
- It is evident in the case studies analysed in this research that each heritage building status is unique in nature. Different buildings may possess several sets of values and several risks in the same risk category (see Figure 11) but with varying intensity and impact, thus rendering each adaptive reuse project exceptional in terms of ways of handling. It seems that this lack of homogeneity between buildings is another factor of hindering the likelihood of choosing adaptation as an option, since there are no clear and sound conservation guidelines binding such buildings together, unlike new construction projects. Although adaptive reuse can be very successful if it respects the initial element that calls for conservation of heritage (that is heritage values), it can, on the other hand, be extremely detrimental if not carried out in a considerate manner.

Discussion: the role of PPPs towards alleviating risks associated with adaptive reuse of heritage buildings in Egypt

As the main guardians of heritage, governments face pressuring demands to sustain heritage and provide other public services. Accordingly, the private sector (ADFs/developers specialized in heritage conservation) could aid the GOE in managing adaptive reuse risks of heritage buildings through sharing of such risks and providing expertize in the field, financial capital or finding ways for the funding of such projects. ADFs/developers employ diverse people in various professions relating to the development and construction sector as well as possessing expertize, knowledge and up-to date technologies in this area. For instance, ADFs/developers specialized in heritage conservation can provide a range of services such as 'conserving heritage buildings at risk', 'conservation and historic building advice' and 'conservation management plans', all while protecting what is important and changing what can be changed based on an understanding of the building history, significance and context (Purcell 2017). However, a clear and sound policy and agreement on goals and objectives of the partnership as well as roles and responsibilities should be provided to avoid situations of conflict between both parties and the over-exploitation of heritage sites by the private sector for short-term, immediate profits (Macdonald 2011).

In that light, the type of PPP that could be used in heritage building conservation projects in Egypt is BOT (see Table 4), since the MPMAR (2016) already mentioned its plans for using such agreement with the private sector for infrastructure projects

Table 13. Risk sharing between the private and public sectors in adaptive reuse of heritage buildings in Egypt (Developed by Authors).

PPP type	Risk Category	Role of sector involved to mitigate risks of adaptive reuse of heritage buildings	
		Private (ADFs/developers)	Public (Government)
B/COT (build/ conserve- operate- transfer)	Functional	x	
	Economic	x	x
	Social	x	x
	Technical	x	
	Financial	x	x
	Political		x
	Legal		x
	Environmental	x	

in Egypt. A similar model is used by Sigma Properties in Alexandria, 'Buy-Conserve-Operate (BCO)' (see Table 4), where the company purchases heritage buildings from its private owners and adaptively reuses them according to the best suggested new use (Badawi 2017). The only difference is that the public partner is absent in such an agreement.

According to Mansfield (2009), the use of specialist design consultants, such as architects and building surveyors can considerably enhance the management of risks in addition to ensuring optimum performance beyond the acknowledged key variables of cost, time, and quality. Hence, Table 13 shows a preliminary risk allocation matrix classifying the risk categories associated with adaptive reuse of heritage buildings previously discussed and the responsibility of each sector in managing those risks in the PPP agreement.

ADFs can help in mitigating functional and technical risks since such risks need expertize in their management, especially when it is related to heritage structures. For example, architects are likely to possess knowledge of functional spaces and how they could be utilized and reused to ensure compatibility of the new use with the heritage structure. Additionally, they are more attentive to addressing sustainability issues related to design of buildings, the level of comfort inside buildings, safety standards and authentic materials used in heritage buildings all while complying with the heritage building conservation standards, physical restrictions and values (refer to Case Study 4). Political and legal risks are the public sector responsibility since it holds political legitimacy and the authority to act (Rypkema 2013). The cooperation between both sectors is vital in order to achieve sustainable, feasible and viable heritage conservation goals, especially with the huge amount of heritage that Egypt possesses. The engagement of the community is also important in the decision-making process to avoid situations of scepticism and public outcry (Macdonald and Cheong 2014). Community and stakeholder engagement as well as spreading awareness of the importance of heritage buildings and their protection through adaptive reuse falls under social risk, which can be shared between both private and public sectors, with a little help from NGOs when needed. Financial risks can be allocated to both sectors as well due to the ability of the private sector to fund projects as mentioned earlier. The public sector could contribute in this area by providing capital and/or incentives to the private sector in whichever form (ex: grants, subsidies, tax exemptions, etc.) that fits the nature of the project and the needs of the private sector. The private sector could also manage economic risks related to, for instance, economic obsolescence of buildings, due to their detailed attention to market demand while the public sector could support in the case of indirect costs of conservation that could increase contingency costs.

Finally, PPPs can be labelled as "weak" when decision rights, costs, and risks are focused on one partner, or they can be classified as "strong" if they are balanced between all partners. Like any partnership, key factors of success lie in achieving the appropriate balance between the needs and capabilities of the partners for the purpose of meeting the long-term goals of the partnership. A lot of the current discussion of PPPs successes and failures has been centered on the allocation of risk and whether the balance of skills and responsibilities is right (Macdonald 2011).

In order to put the previous matrix into practice, the researchers have combined a set of Egyptian heritage buildings that could benefit from employing a PPP agreement to ease the risks associated with adaptive reuse, and thus contribute to their protection and revitalization. Three types of cases were chosen, starting by a building that is already being restored, a building that is vacant and in need of adaptive reuse, and thirdly, a building which has already been adapted. Such cases were used in order to be able to find similarities and differences between the different phases; during adaptive reuse, before adaptive reuse and after adaptive reuse. The adaptive reuse risks associated with each project will be highlighted briefly, and based on the preliminary risk allocation matrix suggested previously (see Table 13), a PPP mechanism will be suggested and the risks will be allocated to each partner, and benefits of employing each partner the allocated risks will be discussed briefly as well as a discussion of similarities and differences in the cases (see Table 14). Data such as building ownership, building function, area, source of funding and type of contract employed for restoration work (in the case of restored buildings) were collected to help in the analysis. Accordingly, an analysis of the compatibility of the new/suggested use of the building was conducted and new activities/functions were suggested for improvement.

Conclusions and recommendations

Heritage buildings represent a substantial unutilized resource in Egypt. Egypt has a diverse collection of heritage buildings built in different eras, giving the country a unique and individualistic urban fabric and identity. Unfortunately, the deteriorated condition of the built heritage in Egypt cripples their ability to be used for economic, touristic, social, cultural and educational purposes. The critical status of heritage buildings in Egypt demands an innovative approach to maximize the benefits that could be acquired from them and minimize the risks associated with their reuse. Adaptive reuse of heritage buildings proved to be a successful yet risky approach for heritage buildings conservation. Adaptive reuse risks were compiled and classified in this paper into eight main categories namely, functional, economic, social, technical, political, financial, legal and environmental, comprising of 27 risks in total, supported by case studies for further understanding of such risks in the Egyptian context. It was found that the complexity of these risks is a factor that hinders the decision to adopt adaptive reuse for heritage buildings more often, where the most prominent risks were financial and political. The management of adaptive reuse risks requires an interdisciplinary holistic approach, which includes both the private and public sectors to mitigate the impact of such risks. PPP approach is applied in developed countries for heritage conservation projects, and has proved to be a successful approach, where the risks are allocated to each partner based on competency. It was found in the research that this is a main principle of PPP. Consequently, a

Table 14. Case studies displaying the role of PPPs in alleviating adaptive reuse risks for heritage buildings in Egypt (Developed by Authors).

Criteria		Cases		
		1- Ismail Siddiq El-Mufatesh Palace, Cairo. Egypt	2- Sakakini Palace, Cairo. Egypt	3- Aisha Fahmy Palace, Cairo. Egypt
Figures **from left to right:** Ismail Siddiq El-Mufatesh Palace, Sakakini Palace, Aisha Fahmy Palace		 (Wahba 2019)	 (Farouk 2016)	 (The Arab Contractors 2019)
Ownership Status		Public (Ministry of Antiquities)	Public (Ministry of Antiquities)	Public (Ministry of Culture)
Heritage Listing		Listed	Listed	Listed
Building Status		Under-restoration.	Vacant. Unutilized.	Preserved and adapted.
Old use		Residential Palace	Residential Palace	Residential Palace
Current use		Government administrative building	Vacant	Museum and Fine Arts Complex
Suggested/planned new use by the government		Unknown	Museum of Medicine	Museum and Fine Arts Complex
Area		18 main rooms, 42 small rooms and a spacious patio. The palace consists of two parts, North & South (Wahba 2019).	2,698 square metres, including 50 rooms (Farouk 2016).	2,700 square metres, including 30 rooms, two large halls, a basement and a roof (State Information Service 2017).
Funding		Ministry of Antiquities budget/Public	None	Cultural Development Fund
Budget		Stating 62 Million EGP, reached almost 200 million EGP	None yet	30 Million EGP
Type of contact for restoration works		Public procurement with 3 consecutive contracting companies	None	Public procurement with the Arab Contractors Company
Suggested mechanism for finance, restoration, operation & management		B/COT	B/COT	Operational License (Building is already restored).
Adaptive reuse risks	**Functional**	• Poor structural stability	• Rotten wood floors and damage from the 1992 earthquake and a fire (structural stability) (Farouk 2016).	–
	Economic	• Indirect costs of conservation	• Lack of business opportunity from new suggested building use. The building was suggested to become a Museum of Medicine (Davidson 2008).	• No entrance fees are charged (Adel 2018), affecting the ability of the place to generate sustainable revenues.
	Social	• Lack of awareness of heritage value	• Lack of awareness of value of adaptive reuse opportunities, where local people suggested mere restoration without new function (Davidson 2008).	–
	Technical	• Restoration complexity • Construction delays	• Restoration complexity due to damage and neglect.	• Restoration complexity: strengthening of the basement, ceiling, slabs, wall injections; restoration of the weaving works, ornaments, floors, wood, stained glass, and paintings (Metwaly 2015).
	Political	• Lack of political will to conserve heritage. • Lack of top management commitment and support. • Delay of project restoration due to 25th January Revolution.	• Lack of political will to conserve heritage, the palace had been in government ownership since 1961, and in the care of the Supreme Council of Antiquities (SCA) since 1997, and still no restoration was done.	• Lack of top management support and commitment since restoration work on the palace started in 2005, and a partial reopening of the complex was scheduled for 2015 with repeated delays. • Lack of coordination as well as multiplicity of overlapping authorities in charge of historic areas and buildings. The palace ownership and management shifted from one authority to the other along the years (Egypt Today 2017).
	Financial	• Lack of financial resources • Construction delays	• Lack of financial resources, where the Ministry of Antiquities has its own financing, and when there are funds available, it is spent on developing suspended projects (El-Zahed 2019).	• High remediation costs since the palace suffered from neglect and lack of maintenance for several years.

(*continued*)

Table 14. Continued.

Criteria		Cases					
		1- Ismail Siddiq El-Mufatesh Palace, Cairo. Egypt		2- Sakakini Palace, Cairo. Egypt		3- Aisha Fahmy Palace, Cairo. Egypt	
	Legal	• Weak law implementation		–		• The palace operated as an art complex for a small period of time, and then closed for the second time due to ongoing complications between the heirs and the Egyptian court over its ownership (Egypt Today 2017).	
	Environmental	• Threat of high ground water table • (Refer to the previous case studies analysis section for more detailed risk analysis of this case study).		• Damage from fire.		• The internal halls where subjected to humidity, rust and dust, as well as insects and moths before restoration (Metwaly 2015).	
Risk allocation through PPP	**Risks**	**Private Sector**	**Public Sector**	**Private Sector**	**Public Sector**	**Private Sector**	**Public Sector**
	Functional	x		x		x	
	Economic	x	x	x	x	x	x
	Social	x	x	x	x	x	x
	Technical	x		x		x	
	Political		x		x		x
	Financial	x	x	x	x	x	x
	Legal		x		x		x
	Environmental	x		x		x	
Description of risk allocation		**Private Sector:** The private sector in this case would have dealt with functional, economic and technical risks by providing project management and expertize to stop the deteriorated building condition from worsening and conducting restoration works in a timely manner. Such risks could be dealt with through the availability of enough financial resources and funding. The private sector could acquire help from the public sector's relevant heritage conservation authorities through dissemination of information about the building and heritage documents needed for restoration. It could also play a role in promoting and marketing the new building use. **Public Sector:** The public sector would deal more with the legislative framework, providing easements and incentives to the private sector, and addressing social awareness and community participation issues. It would also be responsible for monitoring and following up the restoration works done by the private sector according to the PPP contractual agreement, to ensure that the private sector does not over-exploit the asset, or restrict it to a particular social class.					
Benefits gained for each partner		**Private Sector:** • Long-term revenues generated from new building function/activities. • Enhanced brand and business reputation. • Entrance into new markets. • Philanthropic goodwill for preserving a national heritage asset. **Public Sector:** • Less responsibility for all project risks, including project finance and restoration/construction. • Ability to focus on law implementation and private sector monitoring. • Provision of a public asset for the use and enjoyment of the public/tourists. • Job provisions and economic development. • Revitalization of urban areas. • Utilizing the private sector technical and managerial skills could ensure less delays in the project. • Ability to conduct more adaptive reuse projects, regardless of available budget. • Utilizing the private sector attention to market demand.					
Discussion		By analysing the 3 different cases in the Egyptian context, a comparison between during, before and after the adaptive reuse was shed to light. In the first case, it is evident that the most prominent risk on the project has been the lack of top management commitment and support and the will to conserve this heritage, which caused the building restoration to falter and delay several times, while the building was still used for administrative functions, furthering its deterioration. If a PPP had been employed in this case, the private sector would be keen on finishing the project within time in order to be able to generate enough revenues from operation of the asset following adaptive reuse, since such revenues can only be obtained to payback the initial capital and to generate profits only during the PPP contract time. Additionally, a new compatible use could have been decided for the building, based on the building values, its history, its location, its relation to the community, contemporary needs, and other decisional factors in order to address the restoration from a more economical perspective and ensure economic sustainability to maintain the building. While it has been argued that the private sector could over-exploit the asset for commercial purposes, which is a public concern that should be taken into consideration by the relevant governmental authorities, there has been actual heritage cases developed by the private sector in Egypt that have been restored and reused to a function that protected the building's authenticity and identity, while generating proper revenues (such as the Ismailia for Real Estate Investment company initiative for renovating Downtown Cairo). The public sector role in that case should be to ensure the appropriate degree of intervention by the private sector is maintained. The same issue of compatibility of use could be said for the second case, where the new use suggested by the government would be a Museum of Medicine – which the building actually hosted for a period of time before its closure due to the deteriorated building condition. According to a study Davidson (2008) conducted to investigate the community perception of this suggested use, the majority did not affiliate with it as an appropriate use for the building and suggested other programs if the building was to function as a museum, such as a museum for displaying the 19th century history of Cairo, or an Architectural museum. As for the third case, several factors contributed to the lack of usage of the palace for several years and its damage such as conflict of authorities and the shifting of the palace ownership from an authority to the other along the years, as well as the elongated ownership issues with the heirs and the Egyptian court, which ended with the government paying 72 million EGP for the heirs as restitution (Egypt Today 2017). Against all odds, the palace has been exquisitely restored by a					

(*continued*)

Table 14. Continued.

Criteria	Cases		
	1- Ismail Siddiq El-Mufatesh Palace, Cairo. Egypt	2- Sakakini Palace, Cairo. Egypt	3- Aisha Fahmy Palace, Cairo. Egypt
	private sector company and now is managed by the Visual Arts Sector (public sector) to host different temporary artistic exhibitions and to function as a museum and a platform for young artists to present their work, in addition to hosting musical concerts and performances. However, as mentioned previously, the museum's entrance is for free, which is not particularly economically sustainable for future and ongoing maintenance and protection of the building. An operational license could be provided to a private sector company to manage the asset and create more revenue generating activities for a fixed term, since the usage of a B/COT strategy is not applicable since the building is already restored. The ownership in that case would stay with the government, without any need of transfer of ownership from the private to public sector such as the case with a B/COT delivery type. To conclude, it can be said that in the given cases, several governmental issues caused delays for the utilization of the heritage structures in the most optimum manner to harness social, cultural and economic benefits. Additionally, the new suggested use for the heritage building in the three cases could be modified to achieve more benefits. For example, the third case could increase the frequency and number of performances and exhibition, with user fee charges. The place could also have a small restaurant/café, in addition to more publicity and marketing for the place through social media to attract more visitors locally and internationally. For all cases, the buildings have a huge number of rooms. In such circumstances, these buildings could be used as hotels (check figures 12 and 13).		

PPP without a sound contract and a proper risk allocation matrix could lead to disaster. If the PPP approach is ever implemented in the Egyptian context, the roles and responsibilities of each sector should be well-known and allocated, and the public sector should strictly implement the law should the private sector slack in any deliverables or do not abide by the regulations. Accordingly, the risk categories were allocated in this paper to public and private sectors based on each sector's capabilities and skills in conducting PPPs, which were gathered throughout the literature review and applied in the final case studies section. Given the limited published literature on this approach in Egypt, this paper provided a comprehensive review on the matter at hand, supported by case studies analysis. Having reviewed and analysed the relevant literature and case studies, the research comes to the following recommendations:

Recommendations to GOE

- Governmental authorities are in need of a new holistic approach to harness the maximum benefit possible from the exceptional amount of heritage buildings in Egypt. This approach should not rely solely on the public nor private sector alone, since the traditional method of conserving heritage by relying mainly on governmental authorities to fund and conduct adaptive reuse projects has proven to be unsustainable. In addition, effective communication channels are required to avoid conflicts and wastage of resources which could eventually compromise the heritage asset. Moreover, the GOE should provide and strictly implement a sound contractual agreement that allocates the roles and responsibilities of public and private sectors, risk allocation mechanism, and also provide incentives and easements to attract the private sector to invest in heritage. Furthermore, Governmental authorities in Egypt require an effective regulatory framework and legislations as well as conservation guidelines to properly address the vast amount of heritage, taking into consideration built heritage values, community needs and the risks and benefits of adaptive reuse. Likewise, a proper inventory of heritage buildings needs to be developed by the GOE on a national level to ease the identification of buildings requiring conservation and protection from demolition and misuse. The legislative framework in Egypt needs major updates to address the needs of private owners of heritage to be able to update their buildings in accordance with conservation guidelines. The right support and legislation is needed to be provided so building owners do not resort to demolition or destruction of the asset to de-list it as heritage, but rather to be given the opportunity to adapt it and to take pride that their property is heritage-listed instead of viewing it as a burden.

Recommendations to NGOs and community

- Despite the PPP contractual agreement comprising mainly of the public and private sector, the role of the community and NGOs cannot be excluded from such partnership. NGOs and the relevant governmental authorities need to spread more awareness on the built heritage values and benefits of conserving it, in addition to providing appropriate education on heritage buildings and the prospects of their reuse, in various educational levels. Moreover, community needs and their engagement should be taken into consideration as primary stakeholders affected by decisions taken to utilize this heritage, also as citizens of the country.

Recommendation for future research

- Adaptive reuse risks are diverse, complex and numerous. A recommendation for future research would be to analyse the degree of risk impact on heritage buildings in a quantitative method, which would give an idea on the ranking of risks with relevance to importance. More studies need to be conducted on the feasibility and implications of PPPs for heritage conservation projects in Egypt, specifically adaptive reuse.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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