

Enhancing Environmental Sustainability through Archival Practices: A Case Study of the Intermediate Archives at Oman Airports Practices

تعزيز الاستدامة البيئية من خلال ممارسات الأرشيف: دراسة حالة للأرشيف الوسيط في مطارات عُمان

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Abstract

The study focused on analyzing the role of archival practices in promoting environmental sustainability and learn about the contribution of the intermediate archives at Oman Airports Company in promoting environmental sustainability. Utilizing a qualitative research method, the study gathered data through interviews to meet its objectives. It highlighted five crucial elements that contribute to environmental sustainability in archives, in line with Oman Vision 2040 and e-government initiatives: energy consumption, facilities management, reducing carbon emissions, pollution control, environmental awareness, and policy implementation. A significant finding was the impact of renewable energy and responsible electricity usage on fostering environmental sustainability. The study also pinpointed various practices that help mitigate environmental pollution, such as incorporating indoor plants in the workplace, using eco-friendly products, and implementing sustainable waste disposal practices through recycling and reusing. Moreover, the findings revealed that Oman Airports Company, particularly the intermediate archive, actively engages in efforts to enhance environmental sustainability, integrating these practices into the company's overall policies. The study recommends boosting awareness campaigns to promote both local and institutional environmental consciousness. It also suggests

recognizing and rewarding employees who opt for sustainable practices in archive-related tasks and improving document and transportation management to minimize environmental impact.

Keywords: Archival Practices; Environmental Sustainability; Oman Airports Company; Renewable Energy; Pollution Control.

مستخلص

ركزت الدراسة على تحليل دور الممارسات الأرشيفية في تعزيز الاستدامة البيئية، والتعرف على مساهمة الأرشيفات المتوسطة في شركة مطارات عمان في هذا المجال. استخدمت الدراسة منهجية البحث النوعي، حيث جُمعت البيانات من خلال المقابلات لتحقيق أهدافها. أبرزت الدراسة خمسة عناصر رئيسية تسهم في الاستدامة البيئية في الأرشيفات، بما يتماشى مع رؤية عمان 2040 ومبادرات الحكومة الإلكترونية، وهي: استهلاك الطاقة، إدارة المرافق، تقليل انبعاثات الكربون، التحكم في التلوث، التوعية البيئية، وتطبيق السياسات. وقد أظهرت النتائج أن الطاقة المتجددة والاستخدام المسؤول للكهرباء لهما تأثير كبير في تعزيز الاستدامة البيئية. كما حددت الدراسة ممارسات متنوعة تساعد في الحد من التلوث البيئي، مثل دمج النباتات الداخلية في أماكن العمل، استخدام منتجات صديقة للبيئة، وتطبيق ممارسات مستدامة للتخلص من النفايات من خلال إعادة التدوير وإعادة الاستخدام. وكشفت النتائج أيضًا عن أن شركة مطارات عمان، خاصةً الأرشيف الوسيط، تشارك بفعالية في تعزيز الاستدامة البيئية من خلال دمج هذه الممارسات في السياسات العامة للشركة. توصي الدراسة بزيادة حملات التوعية لتعزيز الوعي البيئي على المستوى المحلي والمؤسسي، كما تقترح تشجيع وتكريم الموظفين الذين يعتمدون ممارسات مستدامة في مهام الأرشيف وتحسين إدارة الوثائق والنقل لتقليل الأثر البيئي.

الكلمات المفتاحية: الممارسات الأرشيفية؛ الاستدامة البيئية؛ شركة مطارات عمان؛ الطاقة المتجددة؛ التحكم في التلوث.

1. Introduction

The intermediate phase in the life cycle of records holds significant importance, as after their active use in office settings, records are preserved in pre-designated areas with specific standards for potential future reference. The reasons for referring to records during this period vary, including verifying individual or group rights, conducting evaluations, planning, oversight, and adhering to legal retention periods for certain types of documents. Notably, traditional records management systems did not place adequate importance on intermediate records, and there were often no dedicated spaces for their preservation. As a result, these records were frequently stored in unused areas of the organization, leading to their deterioration without proper sorting.

One of the key aspects of preserving records during this period is providing an appropriate storage environment in accordance with environmental controls to minimize damage caused by lighting systems, temperature, relative humidity, air pollutants, biological factors, and other related factors, which can significantly impact archival collections. It is worth mentioning that managing archival buildings and their operational control systems is costly and puts pressure on natural resources, including the ever-increasing demand for energy sources (Abbey, 2012). Therefore, there is little benefit in preserving these archival collections at the expense of the health and well-being of the people for whom these collections are maintained. This concern has led to a growing interest in environmental awareness and sustainability among archivists, where environmental sustainability refers to meeting present needs without compromising the ability of future generations to meet their own needs.

Practices such as conserving electricity, conducting preventive maintenance of heating, ventilation, and air conditioning systems, and using energy-efficient equipment are vital. Additionally, monitoring air quality, recycling, and raising environmental awareness are key components of eco-friendly archival practices. These efforts collectively contribute to achieving environmental sustainability—a goal that Oman seeks to instill in its citizens and institutions. This objective is clearly outlined in the first implementation plan of Oman Vision 2040 (Ministry of Economy, 2021). Accordingly, this study seeks to closely explore the

contribution of archival practices to enhancing environmental sustainability and to assess the role of the intermediate archive at Oman Airports Company in this endeavor.

Environmental sustainability refers to the ability of individuals, whether alone or within their institutions, to achieve environmental balance by preserving natural resources for the well-being of current and future generations. Motivated by a sense of social responsibility, institutions across various sectors today strive to achieve the concept of environmental sustainability through the practices they adopt, including in archives. Abbey (2012) highlighted in her article on green archives that many cultural institutions, such as museums and libraries, have already sought to meet environmental sustainability requirements in their practices. However, the standards and research in archival science have focused on facility design and environmental control rather than encouraging simple green initiatives that can be easily implemented in preservation centers. Given the limited awareness and knowledge about environmental sustainability in archives and the scarcity of Arabic studies in this field, particularly in Oman, this study aims to closely examine the contribution of archival practices to enhancing environmental sustainability and to assess the role of the intermediate archive at Oman Airports Company in this regard.

The primary objective of this study is to assess the current state of the intermediate archive at Oman Airports Company by exploring how archival practices contribute to enhancing environmental sustainability. The study attempts to answer the following questions:

What are the important archival practices and factors in promoting environmental sustainability?

What are the archival practices followed in the intermediate archive at Oman Airports Company, and how do they contribute to environmental sustainability?

2. Theoretical Framework and Previous Studies

2.1 Introduction

Environmental sustainability is one of the most crucial modern concepts aiming to balance meeting the needs of the present without compromising the ability of future generations to meet their own needs. Archives, libraries, and museums are

increasingly adopting environmentally sustainable practices to conserve resources and reduce environmental impact. These practices include improving building designs to enhance energy efficiency, using environmentally friendly materials, monitoring water usage, and reducing pollution. By adopting these practices, institutions not only enhance their sustainability but also reduce the consumption of natural resources, supporting environmental preservation for future generations.

Before reviewing previous studies related to environmental sustainability and archival practices, a brief overview of Oman Airports Management Company and the significance and importance of the intermediary archive will be provided.

2.2 Oman Airports and the Intermediary Archive

Oman Airports Management Company is a government-owned entity under the Oman Investment Authority, established in 2002 to manage the civil airports in Oman, including Muscat International Airport, Salalah Airport, Duqm Airport, and Sohar Airport. The company's mission is to enable global and national connectivity while contributing to the nation's growth. In 2019, the company expanded its services to include the management of oilfield airports belonging to Petroleum Development Oman: Fahud, Marmul, and Qarn Alam. The company aims to elevate and enhance Oman's airports to achieve desired objectives and ensure a safe and unique travel experience for all users of its airports (Oman Airports, 2022).

Oman Airports has several subsidiaries, including Transom Handling, which became a subsidiary in 2021. It is the first ground handling service provider to offer a comprehensive range of ground services that meet all the requirements and expectations of airport users in Oman. Additionally, Oman SATS became a subsidiary in 2021, and it is a cargo handling company at Muscat International Airport, providing fast and efficient cargo handling services around the clock for exports and imports to Oman's airports (Oman Airports, 2022).

The Records Management Center at Oman Airports was inaugurated in 2015, covering an area of 787 square meters, divided between a 430 square meter document storage area and 357 square meters for other center facilities. The center includes a mailroom, a sorting and document review room, a meeting room, a

reception area, and offices and service facilities for the center's employees. The center was designed and equipped according to the technical specifications approved by the National Records and Archives Authority. It was equipped with shelves designed for file and document storage, as well as drawers for map storage. The center was also provided with an FM200 fire suppression system, safe for documents, and dehumidifiers to ensure the documents are not affected (Al-Roya Newspaper, 2022).

2.3 The Intermediary Archive

The archive plays a prominent role in preserving the memory of nations and defining their identity. It is considered the foundation for building civilizations, a roadmap for shaping the future, and evidence of the development of nations and peoples in various fields. The Society of American Archivists defines the archive as printed or written materials resulting from legal work, characterized by official status, and used as evidence or proof. It also refers to the building where these prints are stored (SAA, 2024). The Oxford Dictionary defines an archive as a place where public and historical documents are stored (Oxford University Press, 2024). In the context of this study, the archive is defined as the place where archival documents and records are stored, managed, and preserved.

Rouba (2020) defines the intermediary archive, or what is known as the "second-life archive," as the bridge that connects the administrative archive with the historical archive. It contains documents that are not used daily because they have lost their primary value, and they are referred to intermittently as needed. The Omani Records and Archives Law (60/2007) defines intermediary records as "documents that are no longer considered current records and whose usage has become occasional."

Salem's (2015) study, comparing the standards in the guidelines for current and intermediary records in Oman with the ISO 11799 and NISO standards, found some alignment in the specifications related to building locations and construction with international standards. However, the study highlighted that temperature and humidity standards in the guidelines do not align with the values specified in international standards, and there is a complete absence of any standards related

to permissible air pollution levels. Consequently, the study recommended taking preventive measures to protect documents from damage and destruction.

2.4 Environmental Sustainability

Sustainability is a multidimensional concept encompassing social, environmental, and economic aspects. Newenhouse (2009) defines sustainability as "living a beautiful and meaningful life that respects people and leaves the planet a better place for future generations." The United Nations' WCED report (1987) describes sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Abbey (2012) advises institutions and companies to work in a way that considers people, the planet, and the world, linking the success of the institution to its external impact in addition to its internal production.

The literature divided sustainability into three pillars: social, environmental, and economic. The term "green" refers to behaviors and processes that do not harm the environment, known as environmental sustainability. Abbey (2012) defines environmental sustainability as an effort to meet present needs without compromising the rights of future generations. The Oxford Dictionary adds that environmental sustainability means using natural products and energy in a way that does not harm the environment in the long term. These concepts began with the American environmental movement in the early 19th century, focusing on conserving natural resources and humanity's responsibility towards nature (Gottlieb, 2005).

Libraries and museums have begun adopting the green movement, with library associations responding to environmental concerns since the late 1960s. However, environmental awareness among librarians did not emerge until the early 1990s (Marcuma and Jankowska, 2010). For example, librarians initiated steps to reduce waste and raise environmental awareness among users (LeRue, 1991). Marcuma and Jankowska (2010) recommended developing specific strategies to address the ideological pillars of sustainability, as reducing the use of non-renewable resources and recycling alone are not sufficient.

Museum workers have also engaged in the environmental sustainability movement through awareness initiatives, such as the "Recycle Shop" at the

Boston Children's Museum, which collected waste from local factories for reuse in art projects (Brophy and Wylie, 2008). The Boston Museum is the first green museum in the city and is LEED certified. UNESCO's report "Our Creative Diversity" calls for expanding the scope of sustainability factors by adding values and beliefs that influence individuals' behaviors. In response to these recommendations, museum professionals have advocated for integrating environmental sustainability into their institutions' identities (Scheiner, 1997; Worts, 1998).

In summary, archives, libraries, and museums need to adopt environmentally sustainable practices. These joint efforts between document specialists, librarians, and designers contribute to improving environmental sustainability.

2.5 Contribution of Archival Practices to Environmental Sustainability

Archives play a vital role in preserving material and intellectual resources for future generations. However, a balance must be struck between preserving these materials and ensuring the health and survival of the people. Lowe (2020) noted that document specialists retain records to understand the past and present and prepare for the future. Therefore, Abbey (2012) recommended that archival practices be seriously considered to achieve environmental sustainability.

Studies on environmental sustainability in libraries and museums have helped document specialists understand environmental sustainability, but most studies have focused solely on facility and building design and environmental control (Abbey, 2012). The first mention of green archives appeared in the 1990s with the work of Sandra Rowoldt, who recommended using architectural design principles instead of heating and cooling systems. In 2006, the Society of American Archivists (SAA) commissioned a task force to create and publish guidelines for designing and constructing new storage facilities. Pacifico and Wilsted (2009) pointed out the need for standards that make document specialists more responsible.

At the 2009 SAA conference, the focus was on sustainable archives, with presentations on sustainable practices for digitization and archival management. Wolfe (2011) emphasized in his book the need to improve archival practices to complement the design of environmentally friendly storage facilities. Zhang and

Wang (2015) focused on energy efficiency strategies in Chinese archives, highlighting the importance of architectural design, building temperature and humidity, and the use of insulation systems and solar energy.

Kim (2009) discussed green building techniques in archival facilities, such as using renewable energy, natural daylight, reducing chemical usage, recycling electronic waste, and promoting green transportation and remote work. Bielek (2016) recommended constructing buildings with natural cooling to save electricity. Stehkamper (1988) suggested reducing the need for air conditioning through thoughtful building design, using walls, construction materials, and window and shelf arrangements.

Regarding water, most studies emphasize the importance of environmental sustainability in archives, highlighting the need to monitor water usage, fix leaks, and use water-saving devices (Abbey, 2012). A rainwater management and collection system contributes to sustainable water supply (Kim, 2009). Chinese researchers have noted that using acid-free paper and a green fire suppression system can reduce the negative environmental impact (Wei, 2004; Tang, 2003).

In Canada, some archives follow environmentally sustainable practices, such as installing efficient heating, ventilation, and air conditioning systems, reducing staff travel, and encouraging sustainable transportation (Oliver, 2021). Virtual archives also help reduce the need for physical storage and the transportation of materials, contributing to lower energy consumption and resource use, and reducing waste (Singh and Sah, 2020; Chen, 2019). Virtual archives promote the use of sustainable technologies, such as renewable energy sources (Li et al., 2021). However, Pendergrass et al. (2019) cautioned that digitization is not a universal solution due to the environmental impact of power consumption and electronic waste.

Archival practices contribute to environmental sustainability by adopting a holistic approach that includes building design, material use, energy and water consumption, waste management, and digitization. These practices are essential for preserving cultural heritage while minimizing environmental impact, ensuring that future generations can access valuable records without compromising the planet's health.

3. Methodology

This study adopted a qualitative approach to explore the contribution of archival practices to promoting environmental sustainability in the intermediary archive of Oman Airports. The study utilized document analysis and interviews as data collection tools.

The documents analyzed included the Leadership in Energy and Environmental Design (LEED) standard, the Green Archivists' Beginner's Guide, and Oman Vision 2040. These tools were used to achieve the study's first objective, which was to explore the elements and components of environmental sustainability.

The semi-structured interviews, which included both open-ended and closed-ended questions, were conducted to gain a deeper understanding of the study topic. They were used to achieve the study's second objective, which was to highlight the contribution of practices followed in the intermediary archive to enhancing environmental sustainability.

The study population consisted of employees from the intermediary archive and the company's executive management. A purposive sample included three employees—the Director of the Document Management Center, a Mail Coordinator, and a Document Management Specialist—along with the Chief Operations Officer, each selected based on their roles and responsibilities within the company.

The data analysis process involved several key steps. Initially, oral recordings were carefully transcribed into written text to ensure accuracy and completeness. Following transcription, the data were systematically organized and categorized manually to identify patterns and themes relevant to the research objectives. This qualitative analysis was thorough, allowing for an in-depth exploration of the participants' perspectives. Finally, conclusions were drawn, and recommendations were formulated based on the insights gained from the analysis, ensuring that the findings were directly informed by the data.

4. Results

4.1 Environmental Sustainability

Researchers identified factors that contribute to environmental sustainability in archives by relying on three key sources with guiding importance for archivists: The Leadership in Energy and Environmental Design (LEED) standard for building construction, issued by the U.S. Green Building Council (USGBC) (Hollander, 2023), the introductory guide for green archivists "Ten Points for Archivists to Start a Sustainable Collection" (Abbey, 2012), and the Oman Vision 2040 document (Oman Vision 2040, 2024).

Regarding the first source related to the LEED standard, the analyze of this document reveals that obtaining LEED certification means that a building has met certain sustainability standards. This certification focuses on five areas: sustainable site, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. A building that receives this certification is classified as a green building. There are four levels of LEED certification, and any of these levels can be achieved based on the number of points accumulated from the aforementioned five areas. The maximum number of points is 110, and the points required for each level are as follows:

- Certified: 40-49 points
- Silver: 50-59 points
- Gold: 60-79 points
- Platinum: +80 points

The benefit of this certification lies in its ability to improve the health and well-being of workers, as "LEED buildings provide clean air and natural light, and discourage the use of harmful chemicals found in paints and other construction materials that can affect health over time" (Hollander, 2023).

As for the introductory guide for green archivists, it outlines ten factors that help archivists achieve environmental sustainability. The first factor emphasizes sustainable strategic planning, represented by policies and sustainability standards, raising environmental awareness, and continuous learning. The second factor discusses green assessment through energy monitoring, calculating the carbon footprint, and obtaining LEED certification, while the third factor focuses

on green facilities. The fourth factor addresses energy efficiency and conservation through preventive maintenance of equipment and buildings, leveraging sustainable building design in ventilation, heating, and cooling, and using high-efficiency lamps. The fifth factor emphasizes reducing solid waste and recycling by encouraging the purchase of green products, including office supplies, cleaning products, and using cloth gloves. The sixth factor discusses water, focusing on monitoring and repairing leaks on a regular basis, installing water-saving devices, and using drought-tolerant native plants. The seventh factor recommends reducing pollution by reducing the use of chemicals or toxic materials and replacing them with safer materials, recycling hazardous waste and electronic waste, and electronic equipment and tools such as computers, batteries, and printers. It also suggests adding indoor plants to office areas to filter and improve air quality, and offering remote work as an option for employees. For the eighth factor, it focuses on managing green collections, represented by administrative practices such as making smart sustainable decisions, scanning documents once for multiple uses, and buying from local vendors to reduce transportation costs and pollution from vehicles, indicating a conscious approach to environmental sustainability. The ninth factor is dedicated to green education and spreading environmental awareness, achieved through creating a culture of sustainability in various ways, such as forming a committee to focus on achieving environmental sustainability and increasing environmental awareness. The final factor discusses designing green or sustainable exhibitions, adhering to the guidelines set by the Oregon Museum of Science and Industry (OMSI) in the "Green Exhibits Checklist" (Willcox, 2009).

In reference to the Oman Vision 2040 document, it aims to keep pace with regional and global changes. It seeks to reshape the relationship between the public and private sectors and civil society institutions "to ensure effective economic management, a developed and diversified Omani economy, and sustainable development." The vision emphasizes the fair distribution of development resources among the governorates, protection of natural resources and the unique environment, and the promotion of citizenship and authentic Omani identity. It also aims to modernize the education system, support scientific

research and innovation, develop health systems and services, and enhance social welfare components and essential services for all segments of society (Oman Vision 2040, 2024). The vision includes 12 national priorities, as follows:

1. Education, Learning, Scientific Research, and National Capabilities: This priority aims to create a high-quality education system, empowered by human capabilities, and to find sustainable and diverse funding sources for education, among others.
2. Health: aims to create a community with sustainable health, establish a decentralized health system, and ensure sustainable funding sources for the health system, among other goals.
3. Citizenship, Identity, Heritage, and National Culture: Focuses on sustainable investment in heritage and culture, creating a knowledgeable and aware society with skills and capabilities, and ensuring a society capable of evaluating, appreciating, producing, employing, and disseminating knowledge, among others.
4. Social Welfare and Protection: This priority seeks to ensure a dignified and sustainable life for all by maintaining community cohesion, achieving decent living standards, and focusing on youth, among others.
5. Leadership and Economic Management: Aims to create an economic entity that works towards development goals, social justice, and environmental protection.
6. Economic Diversification and Financial Sustainability: Focuses on creating a sustainable and diversified economy based on knowledge, innovation, and technology, utilizing industrial wealth while achieving financial sustainability.
7. Labor Market and Employment: Aims to create a labor market with highly skilled human resources, attract skilled talents, establish organized labor laws, and create a work environment adaptable to changes, among others.
8. Private Sector, Investment, and International Cooperation: This priority aims to create a competitive business environment, establish flexible funding patterns, promote an effective partnership between the public and private sectors, and develop a unique economic identity, among others.
9. Sustainable Cities and Governorates Development: Aims to achieve balanced and equitable development for urban areas and governorates, create smart and

sustainable communities, and ensure diversified and integrated transportation systems with urban development, among others.

10. Environment and Natural Resources: Oman seeks through this priority to create balanced, resilient, and effective ecosystems to protect the environment and sustain its resources by achieving a balance between environmental, social, and economic requirements, ensuring pollution-free environments, promoting the sustainable use of resources, using renewable energy and rationalizing energy consumption, moving towards a green and circular economy, and raising environmental awareness, among others.

11. Legislation, Judiciary, and Oversight: Aims to create a specialized and independent judicial system, and a participatory legislative system by promoting transparency, combating corruption, and raising legal awareness, among others.

12. Governance of the State's Administrative Apparatus, Resources, and Projects: By creating an innovative administrative apparatus based on good governance.

4.2 Contribution of Archival Practices to Promoting Environmental Sustainability:

4.2.1 Electricity and Energy:

E1 mentioned that the energy used in Oman Airports is conventional, produced using fuel, and that they do not use solar or wind energy. He added that the airport is one of the largest vital facilities in most countries around the world, and therefore must rely on reliable energy. The use of solar and wind energy is still relatively new technology. E1 also indicated that there is a move towards using renewable energy in Salalah Airport, but they have not yet begun using it. He also mentioned that PDO Airports, established by Petroleum Development Oman, signed a contract with Oman Airports Company, which became responsible for managing their buildings, and some of these facilities use solar energy. However, renewable energy has not yet been used in the document management building.

E1 stated that there is a special department for health and occupational safety, as well as another department known as the Technical Services Department, which specializes in researching the latest technologies in the field of environmental sustainability. He also mentioned that the Health and Environmental Safety Department is very keen that the environmental aspect is considered by the

company's departments and divisions. He explained that these departments conduct regular visits to departments and employees to ensure their commitment to the environmental aspect. E1 clarified that these mentioned departments are concerned with the environmental aspect, while their Document Management Department is responsible for implementation. However, they can submit recommendations and proposals to these departments, which then implement and encourage them.

E1 also mentioned that all offices in Oman Airports have sensor-operated lighting, which turns on when there are employees in the office and turns off when there are no employees, which helps conserve electricity, except for the document management building. E1 explained that the reason is the absence of windows in the building, so if the employee sits without movement, the lights will turn off, and there will be no alternative lighting or even natural lighting. E1 added, "*We did not prefer this type of lighting.*" He explained how employees in the department are keen to use the lights only when necessary, where an employee starts his shift at six in the morning, turning on the lights in the main areas until the employees arrive at seven, and turns them off at the end of the workday immediately after the employees leave, except for some lights that employees cannot control. E1 indicated that the building cannot be entirely dark, and this directly applies to the document storage area.

E1 explained that there is a sector within Oman Airports specialized in monitoring energy consumption, which is the Technical Services Sector, and includes departments for electricity, water, mechanics, etc. This sector monitors electricity and water consumption within the airport and submits regular reports on them. He pointed out that the Document Management Center does not intervene directly in this matter, and emphasized that their role lies in refining the practices they follow that contribute to reducing energy consumption. Additionally, E1 mentioned that the Health and Environmental Safety Department issues awareness publications and sends them to employees via email.

E1 also added, "Even water operates with sensors, it turns on when you put your hand (it operates when you place your hand), so there is no room to forget to turn off the water, which also saves water."

4.2.2 Facilities:

E1 explained that the building received carbon accreditation. E2 added that the building uses health-safe paint that is fire-resistant, and he mentioned that the building uses a dust- and insect-resistant flooring.

E1 mentioned that there is a dedicated office in the Technical Services Department, which submits technical reports related to the readiness of the document management building and its environmental sustainability. This office conducts monthly tours of all the company's buildings and submits reports on them. These reports include inspection of the cooling system, fire system, and others. This office also makes recommendations and proposals for improvement, which are immediately implemented.

E1 also mentioned that the new passenger terminal at Muscat Airport is LEED Gold certified.

E2 added that the air conditioning in the building is well-maintained, and any malfunctions are addressed immediately, to prevent mold formation due to water leakage from the cooling system, and to prevent the documents from being damaged.

Regarding the parking lot, E1 explained that parking is open for Oman Airports employees, including the Document Management Center's employees, but most of the time, the staff uses an internal bus from the airport parking to reach their workplaces. He added that employees must turn off the car's engine while waiting for the bus to reduce carbon emissions.

4.2.3 Pollution:

E1 mentioned that indoor plants are used in office spaces and corridors, which help purify the air and improve mood. For example, he said, "*This plant—located in the office—is called a Snake Plant, and it is known as one of the plants that purifies the air.*"

Regarding ventilation, E1 indicated that an air conditioning system is used, and an air purifier has been provided in the sorting hall because old files, which contain dust, dirt, bacteria, fungi, and the like, are sorted there. He explained that this device purifies the air in five stages, addressing odors emitted from

documents, dust, and fungi, helping to create a healthy environment for employees.

E2 added that dehumidifiers are used in the storage area, with four devices each covering an area of 100 square meters. Devices are also available to measure temperature and humidity, allowing for control over these levels to prevent damage to the documents.

E1 pointed out that protective tools are used in the sorting hall besides the air purifier, such as sanitizers, so that employees can disinfect their hands periodically, in addition to gloves, though he noted that plastic gloves are used.

E2 mentioned that the lights used in the building are LED, which are energy-efficient, and E3 confirmed this, adding that they are designed and distributed intelligently, contributing to a reduction in the number of lights needed.

Additionally, both E2 and E3 explained that cardboard boxes are used for storing documents and archival materials, which can be recycled after they are no longer needed.

E1 stated that documents scheduled for destruction are disposed of at the Secure Document Destruction Facility in coordination with the authority, after which the authority recycles them by selling the raw materials. He also mentioned that electronic waste, such as hard disks, is also destroyed by the authority. He noted that all computers at the airport, when they reach the end of their lifespan and are slated for sale, have their hard disks removed, and the parts without hard disks, which contain data, are sold and then destroyed at the authority's destruction facility.

E1 and E4 pointed out that environmentally friendly transportation is linked to the state's overall system. If the State provides environmentally friendly transportation like buses, employees can use them, thereby contributing to reducing emissions. He mentioned that Oman Airports has signed an agreement with Shell on the sidelines of a conference related to environmental sustainability organized by the Ministry of Energy and Minerals. The agreement stipulates that Shell will provide environmentally friendly vehicles for Oman Airports to use on the airfield, utilizing green hydrogen technology, which involves extracting

petroleum from environmentally friendly equipment using wind energy and other methods.

E1 added that remote work can help reduce the damage caused by transportation. He pointed out that a remote work system has been implemented in the department, with one day per week assigned to each employee from Monday to Wednesday, with Sunday and Thursday being excluded.

4.2.4 Environmental Awareness

E1 explained that the Health, Safety, and Environmental Department is responsible for training and raising employee awareness about practices aligned with environmental preservation. He stated that Oman Airports, in general, and the Records management Department, in particular, are not concerned with raising environmental awareness in the broader community but focus on raising awareness within the employee community. He said that this is done through the Health, Safety, and Environmental Department, which sends internal email bulletins, organizes workshops, and visits offices to explain things to employees. E4 mentioned an initiative carried out by the airport, which involves turning off the lights, especially outdoor ones, for an hour during Earth Hour.

5.2.4 Policies

E1 and E4 noted the existence of an Environmental Protection Committee responsible for setting policies related to occupational health, safety, and environmental issues, and it is concerned with Oman Airports' commitments towards environmental preservation and sustainability. They added that there is significant attention given to the environmental aspect because airports can win international awards through it. For example, Muscat Airport and Salalah Airport have received international awards related to their environmental commitment. E1 and E4 also confirmed that a budget is allocated to contribute to environmental preservation.

E1 and E4 emphasized the existence of policies to promote environmental sustainability within the organization's strategic objectives, citing two policies: The Energy Management Policy and the Environmental Policy. The Energy Management Policy focuses on adopting best practices in providing safe, clean energy and ensuring its availability according to operational requirements and

international standards. This policy also commits to achieving excellence in energy management.

The Environmental Policy, on the other hand, is concerned with adopting practices that reduce harmful environmental impacts resulting from activities and services, working to minimize and eliminate them.

Furthermore, E1 referred to the crisis or risk management plan, stating that it includes three stages: procedures before the disaster occurs (such as floods, rainwater, wadis, theft, looting, etc.), the expected disaster (e.g., during cyclones, warnings from the Civil Aviation Authority), and E2 added that there are actions that can be taken, such as moving files on the first two shelves to higher levels. The second stage involves procedures during the disaster, explaining how to deal with the danger or disaster. The final stage involves post-disaster procedures, such as lessons learned and how to address the damage and prevent it from happening again. This is related to environmental sustainability, as reducing risks prevents potential environmental damage.

Concerning digital transformation, E1 and E4 affirmed that the more the transformation to digital is achieved, the more it preserves the environment by reducing electricity consumption, air pollution, bacteria, fungi, paper, ink, and other resources. E1 also pointed out an initiative being implemented at Oman Airports, which aims to reduce paper printing so that transactions are carried out electronically. This initiative began in the mail department, where 99.5% of outgoing mail from Oman Airports is now sent electronically via email, signed, stamped electronically, and then sent to the relevant parties. The percentage for incoming mail is 85%, with the remaining percentage representing invoices, contract signings, and similar tasks related to the finance department. E2 added that this initiative also contributes to reducing petroleum use and saving costs.

5. Discussion

Based on the reviewed literature, it was found that there are more than thirty factors that can be divided into seven categories, which can be applied to national and government archives. These categories are: electricity, water, pollution, exhibitions, facilities, archivists' practices, education, and awareness. Since the study focused on the practices followed in the intermediary archive and its role in

enhancing environmental sustainability, the following framework was proposed based on the literature analysis and aligned with Oman Vision 2040. It includes five main factors as follows:

1. Renewable Generation of Electricity and Energy: This can be achieved cleanly, either through solar or wind energy, among other methods that contribute to producing clean energy and electricity. The responsible use of electricity, energy, and water through energy-saving products like Energy Star products, smart lighting, and water-saving sensors is also crucial for achieving environmental sustainability. Monitoring the usage of electricity and water by auditing bills and tracking increases is important to guide practices accordingly. Oman's future strategy, as stated in Oman Vision 2040, focuses on "developing unconventional natural resource sources." This includes utilizing various types of renewable energy that contribute to reducing costs for production sectors and enhancing competitiveness. Additionally, the strategy emphasizes adopting a green economy approach and its strategies in developing the Sultanate's infrastructure projects.

The aim is to move towards alternative energy sources like wind and solar energy, thereby enhancing environmental sustainability, contributing to stability, reducing financial management pressures, and supporting the treasury with diverse unconventional natural sources" (Oman Vision 2040, 2024).

In this context, the study results revealed that Oman Airports, including the intermediary archive, do not use renewable energy generation technologies like wind and solar energy. However, there is a direction for Oman Airports to use solar energy in some of the institution's facilities. The study results indicated that energy consumption is being reduced through sensors and the presence of designated employees responsible for this, aligning with the findings of Faulkner et al. (2021), who highlighted that conserving electricity and monitoring its use are crucial factors in achieving environmental sustainability in archives. Wang (2012) also recommended the use of renewable energy (such as solar energy and geothermal heating) in archives to achieve environmental sustainability. The study results showed that intermediary archive employees are aware of the importance of the conscious use of electricity and energy, which is consistent with

the recommendations of Pendergrass et al. (2019) and Abbey (2012), who emphasized the importance of conserving electricity and monitoring energy use in archive buildings. Through these practices, the intermediary archive at Oman Airports conserves energy, although it does not produce it in an environmentally friendly manner.

2. Green Building: This can be confirmed by ensuring that the building meets sustainability standards, such as obtaining LEED certification, which was mentioned earlier. Designing shelves in a way that allows air circulation is a crucial factor that can either hinder or promote air circulation. Regardless of the type of shelves used, there is a general consensus on the benefits of allowing natural air circulation in combating heat and humidity, preventing fungal growth, and insect infestation (Lowe, 2020). Preventive maintenance of building management equipment, which in turn reduces the damages that may result from water leaks, for example, is also important. Monitoring temperature and humidity levels according to the type of archival containers is important to reduce the damage that may occur to the containers.

In this context, the study results showed that the Oman Airports building, including the intermediary archive, has received accreditation from the World Airports Council, in addition to their commitment to the key areas of LEED certification, particularly the sustainable site. This finding is consistent with Faulkner et al. (2021), who emphasized that obtaining LEED certification is an important factor in achieving environmental sustainability in archives. The study results also indicated that the shelves are designed to allow natural and smooth air circulation without any impact on the documents, with a direction to reuse these shelves after the full digital transformation. This finding aligns with what Stehkamper (1988) mentioned about the existence of four interactive features used to achieve environmental sustainability in archives: wall design, building materials, window arrangement, and shelf design. The study results also indicated that there is regular preventive maintenance for the intermediary archive building specifically and the Oman Airports building in general, consistent with the fourth factor discussed by Abbey (2012) regarding energy efficiency and conservation through preventive maintenance of equipment and buildings, as well as Faulkner

et al. (2021), who emphasized that preventive maintenance of heating, ventilation, and air conditioning systems is an important factor in achieving environmental sustainability in archives. Regarding temperature and humidity monitoring in the intermediary storage, the study results confirmed the presence of devices to monitor temperature and humidity levels, consistent with the emphasis of Zhang and Wang (2013) on monitoring temperature and humidity in Chinese archives and library buildings, where various methods have been used to meet temperature and humidity standards to increase energy efficiency.

3. Improving Air Quality: This can be achieved by adding drought-tolerant indoor plants to filter the air, using environmentally friendly products and tools such as cleaning products, office supplies, paints, lighting, fabric gloves, exhibition tools, and others. Proper waste disposal in a sustainable manner, such as recycling files and containers scheduled for disposal after sorting, and recycling electronic waste, is also crucial. Encouraging green transportation for materials and employees, such as using electric cars, choosing public transportation for employees, encouraging remote work, and opting for local suppliers, is important. Striving to create "high-quality, pollution-free environmental settings" is one of the goals of the Environmental and Natural Resources Priority in Oman Vision 2024.

In this context, the study results indicated that indoor plants are used in workspaces outside the storage area to purify the air, while air purification and conditioning systems are used in sorting halls to eliminate dust, bacteria, and dust from old files. The study results also showed the presence of four dehumidifiers covering an area of 100 square meters to improve air quality, aligning with Abbey's (2012) recommendation to add indoor plants to office areas to filter and improve air quality. The results also revealed that employees focus on using environmentally friendly products in some practices but not others. They use cardboard boxes to store documents and archival materials, which can be recycled after they are no longer needed, and there is a direction to hold digital exhibitions to reduce the use of environmentally harmful materials, consistent with OMSI's approach, which encourages the use of renewable materials in exhibitions. However, they use plastic gloves in sorting operations, which are harmful to the

environment, differing from the fifth factor discussed by Abbey (2012), who encouraged purchasing green products, including office supplies, cleaning products, and using fabric gloves. They also emphasized the importance of minimizing solid waste and recycling. The study results also indicated that green transportation is not used in the intermediary archive, but remote work is implemented to reduce emissions from transportation. This finding differed from what LeRue (1991) mentioned about librarians' orientation toward environmental sustainability by reducing waste through using cloth or paper bags instead of plastic bags and choosing sustainable options in transportation. Oliver (2021) mentioned that some Canadian archives follow several environmentally sustainable practices, including encouraging sustainable transportation for employees.

4. Environmental Awareness: This can be achieved by educating and training employees on practices that promote sustainability through awareness workshops and educational publications. Raising environmental awareness in the community through publications on social media accounts, for example, is also important. It is necessary to educate employees so that this awareness is reflected in the practices followed.

In this regard, the study indicated that employees receive training to ensure that practices align with environmental sustainability, in addition to raising environmental awareness through internal email publications. The act of turning off the lights for an hour during Earth Hour by Oman Airports is evidence of the functional community's awareness of the need to preserve the environment. This finding aligns with the ninth factor discussed by Abbey (2012), which focused on green education and environmental awareness, suggesting that it can be achieved by creating a culture of sustainability through various methods.

5. Policies: This involves forming a green committee to study and monitor sustainability issues, reducing practice duplication, and rewarding employees who choose sustainability options. Integrating environmental sustainability within the strategic goals of the archive or the document department by allocating part of the budget to promote environmental sustainability and creating partnerships with institutions that can enhance institutional performance is crucial. Oman Vision

2040, in the priority of state administrative governance, resources, and projects, aims to create a sustainable and balanced partnership through the integration of the public and private sectors, individuals, and civil society to ensure effective institutional performance (Oman Vision 2040, 2024). Digital transformation is one of the most important steps institutions take toward achieving environmental sustainability, as mentioned earlier.

Regarding policies, the study results indicated a strong focus on environmental sustainability at Oman Airports, where a committee responsible for environmental safety has been formed, and the institution has received international awards confirming its commitment to the environmental aspect, aligning with Abbey's (2012) recommendations on the importance of forming a committee to achieve environmental sustainability. The study also showed the inclusion of environmental sustainability in the institution's general policy through energy management and environmental policies, which aim to adopt best practices in energy conservation and reduce harmful environmental impacts, consistent with Abbey's (2012) recommendations on sustainable strategic planning and the recommendation of Marcuma and Jankowska (2010) to develop strategies that set indicators for addressing ideological pillars. The study also highlighted employees' awareness of the importance of digital transformation in reducing paper printing, with 99.5% of outgoing mail and 85% of incoming mail at Oman Airports being handled electronically, contributing to the reduction of carbon dioxide emissions resulting from paper manufacturing.

Summary of Results:

The study's findings revealed several factors that enhance environmental sustainability in archives, some of which have been discussed in the literature. To the best of the researchers' knowledge, there have been no Arabic studies that have explored the role of archives in promoting environmental sustainability. Five key factors, along with several sub-factors, were identified based on the literature review, aligned with Oman Vision 2040's focus on e-government and the United Nations' Sustainable Development Goals. The results indicated that Oman Airports, specifically through its intermediary archive, implements most of the five main factors, with a significant awareness among employees of practices that

enhance environmental sustainability. The study also highlighted the integration of environmental sustainability into the company's policies, as well as a trend toward using renewable energy and adopting an electronic document management system.

Conclusion:

The study concluded that Oman Airports places significant emphasis on environmental sustainability, as evidenced by the establishment of a dedicated environmental safety committee and the receipt of international awards in this field. These findings align with previous studies that emphasized the importance of forming committees to enhance environmental sustainability (Abbey, 2012).

Additionally, the results showed that environmental sustainability is integrated into the company's policies, such as energy management and environmental policies, reflecting the company's commitment to adopting practices that reduce harmful environmental impacts (Abbey, 2012; Marcuma and Jankowska, 2010). The study also highlighted employees' awareness of the importance of digital transformation through reducing paper usage, with a very high percentage of outgoing and incoming emails at Oman Airports, which supports sustainable environmental practices (Al-Watan, 2019).

Based on these findings, the researchers offer the following recommendations and suggestions:

Enhancing Environmental Policies: The company should continue improving and enforcing environmental policies to ensure the achievement of sustainability goals.

Expanding the Use of Renewable Energy: Further efforts should be directed toward using renewable energy sources across all company facilities.

Employee Awareness: Ongoing awareness and training programs should be provided to employees regarding the importance of environmental sustainability and their role in achieving it.

Digital Development: Initiatives for digital transformation and electronic document management should be strengthened to reduce paper consumption.

Collaboration with Academic Institutions: The company should enhance cooperation with academic institutions to conduct further studies and research on environmental sustainability practices in archives.

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