

Mobility-as-a-Service (MaaS) and sustainable urban mobility in the development of the European museum business: a case study of Spain

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Abstract. The purpose of this article is to analyze the current state of museums in Spain through the prism of the dynamic development of innovative technologies in society. The article reveals the tourist preference for Mobility-as-a-Service (MaaS), which is a single digital travel platform that integrates all the necessary information. An important contribution to sustainable urban mobility is public transport, shared bike, shared e-moped, and shared car. These components, coupled with digital services offering route information to museums, information about museums, booking and purchasing tickets to museum complexes, form the basis and are the main MaaS bundle attributes. Methodology is based on scientific and special research methods. The methods used were analysis, synthesis, systematization, classification, generalization of economic and methodological sources. The authors examined the key properties of the processes of formation and development of museums as one of the most representative manifestations of the cultural heritage of society. The article addresses important issues of the tourism sector through the prism of the European museum sector, analyzing: historical aspects of the development of European social institutions of museum affairs, statistical indicators of the number of museums in European countries, emphasizing their key role in the dynamic development of tourism. To thoroughly analyze the development of European museums, the author examines one of the exemplary examples of creating a successful museum sector in Spain. It is proved that the effectiveness of the museum sector development largely depends on its integration into the socio-economic life of the country, accessibility for all social groups of visitors, sustainable development, available additional services, and a modern website with information about the museum.

1 Introduction

Museums are one of the most representative manifestations of a society's cultural heritage, as they perfectly summarize the desire to preserve the valuable heritage handed down by ancestors, as well as the desire to maintain and select those cultural and historical assets

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that reflect the creativity and identity of a society. However, museums are not just a lifeless ensemble of artifacts like other types of cultural heritage (historical buildings, archaeological finds). Museums represent a special type of cultural creativity, are guided by a certain style, and the way the various exhibits in a museum's collection are presented or the extent to which their diverse activities are influenced can have a greater or lesser impact on the museum's attractiveness and the number of visitors it attracts[1].

Museums were founded with different purposes, namely:

- to serve as entertainment venues, scientific places, or educational resources;
- contribute to the quality of life in the regions where they are located;
- to attract tourism to the regions;
- promote nationalist causes or civic pride;
- sometimes openly convey ideological concepts.

Given this diversity of purposes, museums exhibit a surprising variety in content, form, and function. However, despite this diversity, they are bound together by a common goal: the preservation and interpretation of a particular material aspect of the cultural consciousness of society [2].

Museums in Europe have evolved over the centuries to become what they are today. European museums have created both models and warnings for the world society, taking the form of tour rooms to global institutions containing priceless collections and pursuing social and ideological goals and objectives [3].

An important public institution of international importance that plays a key role in the development of museums is the International Council of Museums. It is an international organization of museums and museum professionals engaged in the study, preservation, continuation and communication to society of the world's natural and cultural heritage, present and future, tangible and intangible [4].

It is worth noting that the first organized cooperation between museums at the international level arose through the Committee on Intellectual Cooperation of the League of Nations. In 1922, the Committee established the International Museum Bureau, which initiated a number of studies and publications until it ceased to exist in 1946. And in 1946, the International Council of Museums (ICOM) was founded [5].

ICOM is a non-governmental organization and membership association that sets professional and ethical standards for museums. ICOM provides guidance on issues related to cultural heritage, promotes capacity building and the dissemination of historical and cultural knowledge.

ICOM is the voice of museum professionals in the international arena and raises cultural awareness through global networks and cooperation programs. ICOM includes 45,493 professionals in more than 138 countries, 119 national committees, and 32 international committees.

The main objectives of ICOM in its work in the international museum field are:

- set standards of excellence;
- to lead the diplomatic forum;
- to develop a professional museum network;
- lead a global think tank;
- to carry out international missions in the museum field [4].

ICOM provides global forums for museum professionals through regular meetings in European cities and through sustained communication on social media. ICOM National Committees serve as a professional association in countries where there are no separate associations of museum staff. ICOM is also a recognized advisor on museum issues to the

United Nations Economic and Social Council and the United Nations Educational, Scientific and Cultural Organization (UNESCO)[5].

The 44 countries that make up Europe have their own diverse cultures, histories, and numerous cultural achievements. Museums preserve and showcase these aspects of European cities and regions for locals and tourists alike.

In addition to ICOM, the Network of European Museum Organizations (NEMO), which was founded in 1992 to unite museums in the Council of Europe member states, is active in the museum sector [3].

The mission of the organization: "NEMO ensures that museums are an integral part of European life by promoting their work and value to policy makers and providing museums with information, networking and opportunities for cooperation."

NEMO's core values:

- museums preserve tangible and intangible evidence of the human-made and natural world for present and future generations;
- museum collections tell the rich diversity of history, interpreting its past and present;
- museums encourage dialogue, they encourage society to think, learn and reflect, to celebrate differences and find commonalities;
- museums promote cultural factors, create memory and identity, and stimulate creativity, diversity and knowledge;
- museums are crucial for building a modern, conscious society.

NEMO's focus is on four core values and two cross-cutting themes: collection value, educational value, social value, and economic value, which are important for the positioning and development of museums in the present and future. Based on this, the network focuses its activities on museums in Europe [6].

2 Materials and Methods

In preparing and writing this article, both scientific and special materials and research methods were used. Since the task was to substantiate the historiography and types of the museum sector in Spain and provide a general description of it, the methods of analysis, synthesis, systematization, classification, and generalization of economic and methodological sources were used. The applied methods also allowed to substantiate and explore approaches to the museum management system in Spain, which have their own challenges and problems that need to be addressed in the near future, assessing the possibility and feasibility of their implementation.

3 Results and Discussion

Collections are an integral part of all museums, but unfortunately not all museums have the resources to properly care for them. NEMO facilitates communication between museums to better care for collections and share best practices. In many Western museums, including those in Europe, there was a shift in priorities in the twentieth century, when education took center stage. NEMO aims to make museums a recognized support for educational systems across the European continent. Museums have a strong voice when they are listened to, so NEMO wants the social impact of museums to be heard and recognized by local communities.

Museums attract tourists from all over the world, which means that they are also an economic center for their communities and areas of comprehensive development. In 2018, more than 10 million people visited the Louvre alone. NEMO wants museums to be seen as

a boon to economic growth, not as an institution that takes resources away from local communities.

NEMO communicates with museums across the European continent. The organization's goal is to transfer knowledge between museums and the European Union through networking, international exchange, newsletters, training courses and webinars. NEMO understands the impact of European museums on society, history and culture today and works to ensure that museums are recognized as leaders in education and information [3].

According to statistics, the total number of museums worldwide is 103,842, and the market share of the museum sector is 11.2 billion US dollars. The European tourist region is a consistent leader in terms of the number of operating museums and galleries. The reason for this is the rich history of European society, the dynamic development of culture, industry and science, which has contributed to the creation of numerous collections and priceless exhibitions. Figure 1. shows the statistical indicators of the number of museums in European countries as of March 2021.

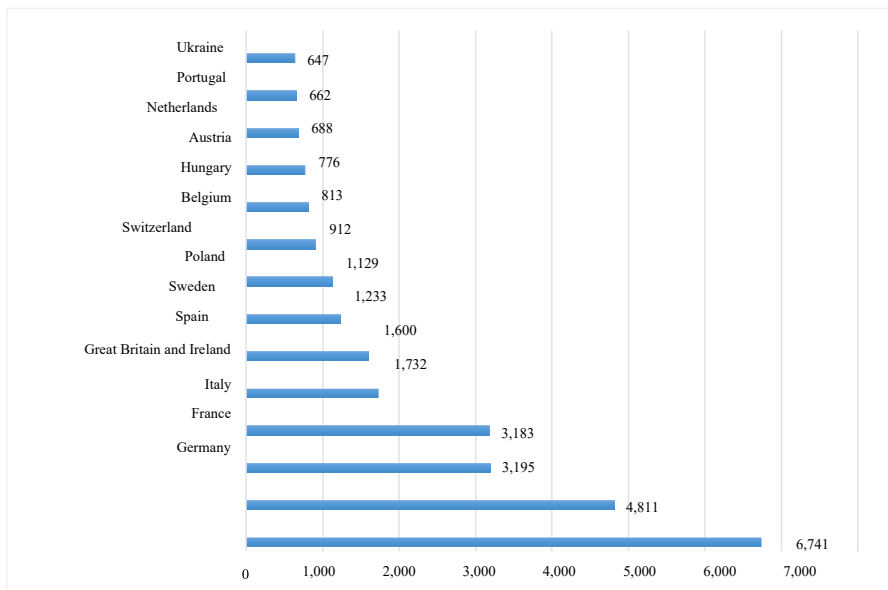


Fig. 1. Chart of the leading European countries by the number of museums [7].

In the European tourism region, Germany, France, and Italy are the leaders in terms of the number of museums. The top five are rounded out by the UK, Ireland, and Spain. These are countries with a rich historical and cultural heritage that attracts millions of tourists every year.

The presence of a large number of museums and galleries indicates that active efforts are being made to preserve the heritage, study and conserve it in detail. In addition, museums in these European countries play a key role in the dynamic development of tourism, as museums are the place of the highest concentration of valuable exhibits that reflect the country's wealth, greatness, long history and deep culture.

Nevertheless, we can say that a large number of museums does not mean an equal interest of tourists in visiting them. The three leaders of the most visited museums in Europe are the Louvre in Paris, France, the Vatican Museums in the Vatican City, and the National Museum of History in London, UK. Each year, they are visited by about 5 million tourists, which is a very high figure.

In 2020, there was a sharp decline in attendance at museums and galleries, caused by the global Covid-19 pandemic. Due to the restrictions imposed by government agencies on visiting crowded places, moving around cities and regions, as well as traveling within the country and especially abroad, the museum sector has undergone dramatic changes and had to adapt to the new reality.

However, some museums have been very skillful in using innovative technologies, namely, improving their websites and publishing online tours of the museum's exhibition halls. This has helped to maintain public interest in museums and the cultural component of social development in general, to keep society interested in the museum, to develop new ways of further work, and to improve methods of communication with target audiences.

To conduct a deeper analysis of the development of European museums, Spain was chosen as one of the exemplary examples of creating a successful museum sector in the country.

Spain is a country rich in stone castles, snow-capped mountains, numerous historical and cultural monuments, and exquisite cities, located in the far southwest of Europe. Spain occupies about 85% of the Iberian Peninsula, which it shares with Portugal.

The Spanish countryside is dotted with aqueducts, castles and ancient ruins, but the cities are modern and dynamic in their rhythm of life. The capital of Andalusia, Seville, is known worldwide for its rich musical culture and traditional folk customs. Barcelona, the capital of Catalonia, is famous for its secular architecture and maritime industry. Madrid, the capital of Spain, is known for its winding streets, numerous rich museums, bookstores, and vibrant life. In addition, Madrid has been an important financial and cultural center of the country for hundreds of years [8].

The history of the development and formation of the museum sector in Spain consists of several main stages, characterized by and corresponding to the historical events of a particular time, the state of development of culture and society (see Table 1).

Table 1. Historical periods of development of the museum sphere in Spain [9].

№	Period	Name	Description of the period
1	1750 – 1800	Formation of the first collections and museums	The Spanish elite of the XVI-XVII centuries, starting with the monarchs, collected paintings by famous domestic and foreign artists to decorate the halls and rooms of their own palaces and estates. The Catholic Church was the main patron of Spanish artists. Several academies were created, namely the Real Academia Española, the Academy of History, and the Academy of Fine Arts. In the 18th century the Spanish state took the first steps to protect and define the Spanish artistic tradition. Academies created their own collections of objects: the Cabinet of Numismatics in the Royal Library, the Cabinet of Antiquities in the Academy of History, access to which was limited, but they can be considered the first prototypes of museums
2	1800 – 1833	Creating royal museums for a new national audience	The creation of the first "national museum" was the result of the emergence of the "nation" as an ideology and political program. Between 1808 and 1913, Spain was under the occupation of the imposed King Joseph Bonaparte. It was he who took the initiative to create the first public museums in Spain. The purpose of their creation was to promote the education of people, as well as to legitimize the new regime during the looting of French troops. In 1809 and 1811, decrees were issued establishing the Museo Josefino (art museum) and the Royal Museum of Natural History, respectively. However, both museum initiatives were postponed and later completely canceled due to the war. In 1815, King Ferdinand VII established the Royal Museum of Natural History (Real Museo de Historia Natural) and in 1819 the Royal Museum of Painting (Real Museo de Pinturas). In 1830, the Royal Academy put forward a proposal to create a Museum of Antiquities (Real Museo de Antigüedades), which would use the

			Academy's own collections and those of the Royal Library. In 1867 the museum project was implemented at the time of the founding of the National Archaeological Museum
3	1833 – 1868	Nationalization of the past	Nationalization of buildings and works of art, which are of value to society and the nation, took place. Some members of the intelligentsia of the time were against the loss of ancient buildings and works of art, so the idea began to emerge "national heritage". The intelligentsia saw in these "monuments" and "art treasures" evidence of Spanish genius, and asked the nation to take care of them. This resulted in the creation by the state in each Spanish province of Comisiones de Monumentos Históricos y Artísticos (Commissions for Historical and Artistic Monuments) under by the leadership of the Comisión Central de Monumentos (Central Commission for the Protection of Monuments). Their members were tasked with visiting oppressed and abandoned monasteries, collecting the most significant and valuable works of art and storing them in provincial museums of fine arts (Museos Provinciales de Bellas Artes)
4	1868 – 1900	National identity in the era of colonialism	In 1866, Queen Elizabeth II founded the Palace of National Museums and Libraries (Palacio de Biblioteca y Museos Nacionales), the building of which was designed by the architect Francisco Jareño, and was intended to unite the main repositories of national culture: the National Library, the National Historical Archive and the National Archaeological museum. However, in 1868, during the democratic revolution, the queen was dethroned. The six-year revolutionary period (Sexenio Revolucionario) began. Governments during these years promoted the creation of national museums in order to continue the state process of previous decades in the direction of cultural development from a progressive point of view. This period in Spanish history is characterized by the spread of new philosophical ideas, the main role of which was played by scientific associations. The Spanish Anthropological Society (Sociedad Antropológica Española) was responsible for the creation of the National Anthropological Museum (original name: Museo Antropológico, current name: Museo Nacional de Antropología)
5	1900 – 1936	The search for national identity	The priority of this period was the creation of national heritage, which was the responsibility of the Ministry of Public Education. It began compiling lists of national monuments and developing a draft law on national heritage. In 1910, the El Greco House-Museum opened in the city of Toledo, dedicated to the outstanding Spanish artist of Cretan origin, El Greco, who was recognized as a master of the Spanish school of painting. The development of museums in Barcelona was one of the key directions of Catalan politics at the turn of the 19th and 20th centuries. This prompted the creation in 1902 by the city council of the Council of Museums (Junta de Museus). In 1914, thanks to a private initiative, the Museum of Fine Arts (Museo de Bellas Artes) was opened in Bilbao. From 1931 to 1936, Spain experienced a republican period, during which democratic governments took an active role in nurturing national culture and in 1933 passed the National Art Treasure Law. The law clearly defined the public function of museums and confirmed the role of the state in the protection of national heritage, which was defined in broad terms: artistic, natural, archaeological, historical and ethnographic
6	1936 – 1975	The period of Frankism	The civil war of 1936-1939 resulted in half a million deaths, as well as the destruction of cultural monuments, along with initiatives to protect them. On the part of the Republicans, the revolutionaries systematically destroyed religious art, the authorities made efforts to preserve the collections of national museums, especially the masterpieces of the Prado Museum, which were transferred to Geneva with the help of the League of Nations. In April 1939, he confirmed his leadership after the end of the war General Franco (1939-1975). At the end of 1939, the Franco government managed to return the masterpieces of the Prado

			Museum from Geneva. In addition, negotiations began with the French authorities, which were under the control of the German occupation forces, to receive certain works of art of Spanish origin, which are kept in Paris museums. The negotiations were successful, and in 1941 some of the Spanish works were returned. In 1964, the Sephardic Museum (Museo Nacional de Arte Hispanojudío y Sephardí) was opened in the city of Toledo, which served as a kind of symbol of reconciliation with the forgotten parts of Spain's past. The museum was established on the site where the synagogue of the city used to stand before the edict of exile, which was issued in 1492 by the Catholic kings. Collection of the Sephardic Museum shows the life of the Sephardic Jewish community both before the exile and in the diaspora.
7	1975 – 2008	Museums of democracy	In 1978, the Constitution was adopted, which marked the beginning of the construction of a democratic Spanish state, based on a policy of reconciliation and providing amnesty for crimes committed by both sides during the civil war and Francoism. In 1985, the Law on Historical Heritage (Ley del Patrimonio Histórico Español) was passed, which stated that the management of state museums could be transferred to autonomous communities. As a result, most of the provincial state museums have been handed over to local communities, while the buildings and museum collections remain state owned. Spain's national museums are managed and owned by the state. In 2006, all museums united in a single Network of Spanish Museums. The decentralization of museum management had a diverse impact on museum geography. For example, the museums of Tarragona and Mérida have been elevated to the category of national museums because of the importance of their collections. In 1990, the Autonomous Government of Catalonia created the National Museum of Art (Museu Nacional d'Art de Catalunya), which was supposed to serve as the basis of the museum system of Catalonia. Also, the central Spanish government at the beginning of the 19th century. tried to restore national museums and establish new ones
8	2008 – to this day	Modern stage of development	It is characterized by the rise of the museum sphere, large and dynamic tourist flows, the development of plans for the restoration and reconstruction of historical museum buildings, renovation of exhibition halls and active introduction of museums into the tourist sphere.

Spain's museum sector is rich and diverse, with numerous collections of priceless works of art from different eras that are unique and rare. In most cases, Spanish museums are located in old buildings of the XIX - XX centuries, which are characterized by numerous stucco moldings on the facade of the building and inside the halls, high ceilings and large windows that let in a lot of natural light, creating a pleasant atmosphere in the exhibition halls. Also, the massive staircases leading to the higher floors are made of marble or high-quality wood. In addition, there may be sculptures and bas-reliefs that are an integral part of the museum building.

If we talk about more modern and restored museums, they are dominated by the use of lighting effects (illumination of individual exhibits, play of shadow and light, color effects that emphasize the features of exhibits), music and video materials. There are also light colors of the exhibition halls (white and milk color), set off by dark wooden floors or dark curtains on the windows.

The exhibition halls are decorated in accordance with the thematic focus of the museum, the architectural style of the building, and the peculiarities of the interior layout of the halls. In most cases, the exhibition halls of art museums are decorated according to the periods of development of Spanish and international art, distinguishing exhibits by time period, artistic style, historical period, or individual artists or art groups.

This approach helps to logically structure the museum collection, highlight its "pearls," and create a special atmosphere in the halls using appropriate colors, volumes, shapes, and sizes of interior elements.

Spanish museums have valuable collections of national art representing the heritage of such famous artists as Salvador Dali, Pablo Picasso, Francisco Jose de Goya, Diego Velázquez, Antonio Gaudi, Antonio González Velázquez, as well as numerous sculptures, works of decorative art, busts, bas-reliefs, and archaeological exhibits reflecting a particular era of Spain's rich history.

Every year, museums in Spain are visited by millions of tourists who are fascinated by the historical and cultural knowledge of the country of travel, want to see world masterpieces with their own eyes and touch history. Unfortunately, during the global Covid-19 pandemic, museums were closed for a long period of time and had to adapt to the new realities of social and economic life. Figure 2 shows statistics on the average number of visitors in 2020, when museums in Spain opened their doors to visitors and tourists.

As can be seen from the above statistics, contemporary art museums (Queen Sofia Center for Contemporary Art, Guggenheim Museum in Bilbao, Museum of Contemporary Art in Barcelona, Museum of Contemporary Art of Castile and Leon), slightly less popular are fine art museums (Prado Museum, Dalí Museum and Theater, Museum of Fine Arts of Seville), and site-museums (Alhambra in Granada, Sagrada Familia in Barcelona, Buen Retiro Park and Palace, Madrid).

The concept of site-museums appeared in 1950 and described museums in a place of historical or scientific significance. The purpose of such museums was to interpret the place for visitors, i.e. to create appropriate conditions for visitors without destroying or rebuilding the existing object (park, palace, castle, fortress, fortification, temple, cathedral, etc.). Site-museums covered both historical and archaeological sites and interpretive visitor centers near natural and historical monuments, as well as in picturesque parks. Over time, the term site-museums became partially identified with open-air museums (skansen), covering historic houses, living history museums, historic villages and towns, parks, and architectural objects of different periods [11].

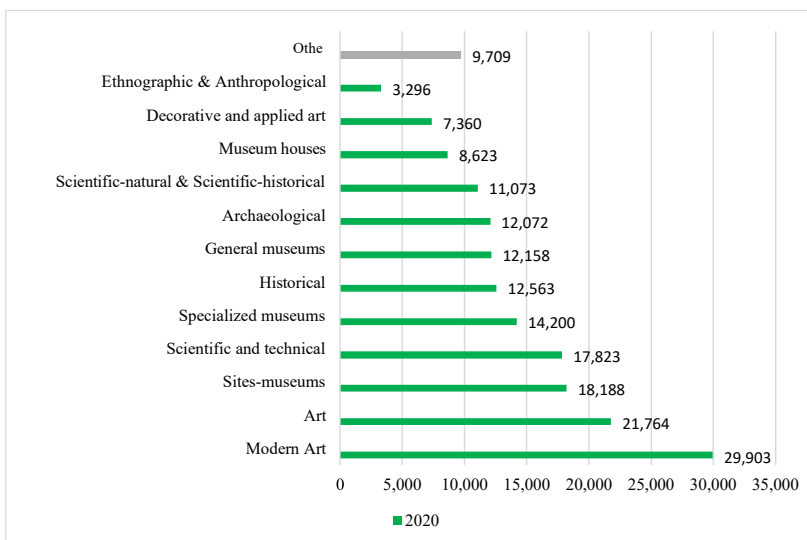


Fig. 2. Diagram of the average number of visitors to museums in Spain in 2020, by thematic direction [10].

The Spanish museum management system uses both social and economic approaches, which have their own challenges and problems that need to be addressed in the near future. The social approach covers numerous areas, but four main problems have been identified: public relations, communication and marketing in museums, the use of technology as a tool to support and facilitate operations, and the sustainability and accessibility of museums for all social groups in society. On the economic side, two main problems are identified: the search for alternative sources of funding and training of museum professionals to address the above problems. That is, qualified personnel with a high level of training and professionalism will be able to use available resources more rationally, attract new investments, develop development projects and communicate with society both within the country and abroad at the global level [12].

As already mentioned, the greatest public interest is shown in museums of contemporary art, art, natural science, and site-museums. Their large number in different cities of Spain, rich collection of works and exhibits, accessibility, informativeness, and aesthetics fascinate visitors from different cities and countries. An interesting indicator is the number of temporary exhibitions, which indicates the active development of the museum sector, the implementation of cooperation with contemporary artists or international museums. The largest percentage of temporary exhibitions are sold by museums of contemporary art, archaeological, art, house museums, historical, specialized, scientific and technical museums, and site museums.

Spanish museums' collections include hundreds of thousands of objects of historical, cultural, natural, scientific, and technical heritage that impress with their history, uniqueness, volume, and form. The total number of museum exhibits in 2020 amounted to 53.911 million objects, which is 10.687 million more than in 2012. The dynamics of growth of museum collections is observed in all museum groups, demonstrating one of the aspects of the development of the museum sector, namely exhibition work (see Table 2).

Table 2. The number of museum funds and collections in Spain [13].

	Museum funds and collections (millions)				
	2012	2014	2016	2018	2020
In general	43,224	43,601	46,926	48,464	53,911
Archaeological	7,674	8,282	8,505	8,742	10,091
Modern art	380	407	646	669	610
Decorative and applied art	234	236	206	216	337
Artistic	1,830	1,902	1,952	1,511	1,706
Museum houses	760	698	690	729	778
Scientific and technical	212	222	292	323	319
Natural and scientific	12,350	11,733	15,032	15,228	18,097
Sites-museums	415	413	414	497	579
Specialized	3,050	3,114	2,988	3,346	3,440
Ethnographic and anthropological	4,002	4,104	3,636	3,630	3,922
General	11,744	11,893	11,959	12,733	13,134
Historical	556	580	590	839	886
Others	17	17	17	1	11

As can be seen from the above data in Table 2, natural science museums, archaeological, ethnographic and anthropological, specialized and art museums have the

largest collections of exhibits and objects of national heritage. Figure 3 shows the percentage of museum collections in 2020.

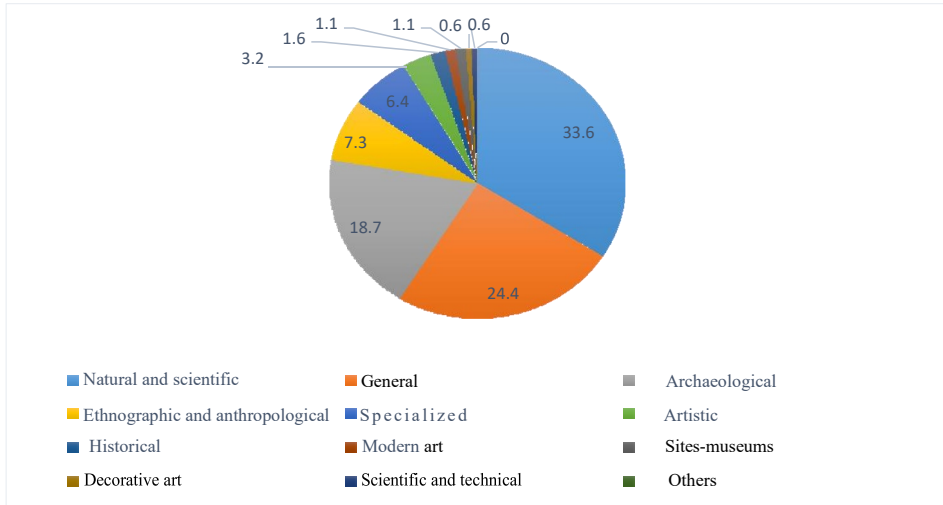


Fig. 3. Diagram of the percentage ratio of Spanish museum collections in 2020 [13].

An equally important indicator of the development of the museum sector is its integration into the social and economic life of the country. This includes accessibility for all social groups of visitors, sustainable development, available additional services, a modern website with information about the museum, and much more. Figure 4 shows statistical information on services and facilities provided to museum visitors in Spain.

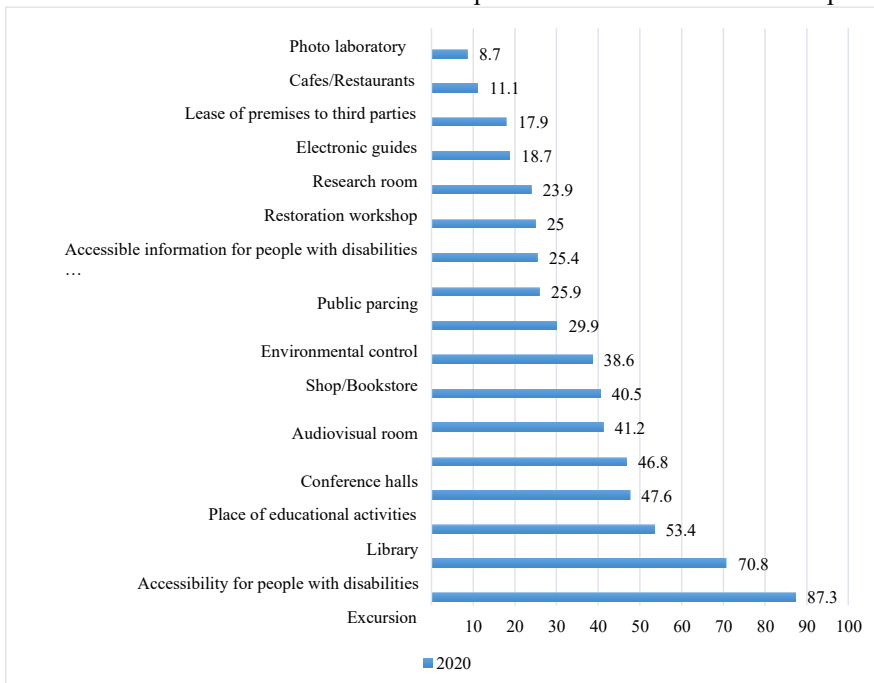


Fig. 4. Diagram of museums in Spain according to the availability of services (in %) [10].

The most common services and amenities for visitors in Spanish museums are information about the permanent collection, guided tours, accessibility for people with disabilities, and libraries. The following amenities in museums have an above-average percentage: a place for educational activities, conference rooms, audiovisual rooms, a shop and a bookstore. Below 30% are environmental control, public parking, accessible information for people with disabilities, a restoration workshop, a research room and electronic guides, renting premises to third parties, cafes/restaurants, and a photo lab.

About 96.6% of museums in Spain have computer equipment as an effective tool for organizational and administrative processes and access to the Internet. This helps to perform simple daily tasks, keep records and analyze the level of museum attendance, its economic performance, and cooperate both nationally and internationally.

In Spain, 9 out of 10 museums and museum institutions have their own website, which provides information to the public, as well as communicates with contact audiences, visitors, and users, creates educational projects, and sells museum tickets and additional services online [10].

4 Conclusions

Thus, the study of the peculiarities of the development of European museums on the example of Spain made it possible to determine that Spanish museums have come a long way from private collections and the first exhibitions to international museum institutions with numerous collections. The level of attendance of museums in Spain is high, which characterizes, respectively, the level of domestic and international tourist flows and the dynamics of tourists' interest in cultural and educational tourism, where museums are one of the key elements.

Thus, the analysis of the European experience of museum development on the example of Spain proves the need to introduce innovative ideas for the development of the museum sector, ensuring the creation of an integrated European museum system in the domestic and international tourism markets.

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