
Summary: Economic impact of creating and exhibiting 3D objects for blind and visually impaired people in museums

This summary aims to consolidate the socio-economic value of cultural goods, the pivotal role that the museums play in a society on the one hand, and the economic impact of museums as well as the inclusive innovations required for the museums to be accessible to a wider spectrum of the society on the other. The 3D printing technologies for blind and visually impaired people is one of such technologies that is the main focus of this study.

Museums fall into one of the core cultural activity of a society as they are viewed as the guardians of heritage and culture of people and are entrusted with the task of preserving art and cultural aspects of the society for generations. Museums, besides being repositories of culture, also play a vital role in modern education and learning process by offering scientific, cultural and educational exposures to visitors and focusing on creating opportunities for visitors to develop and realize their creative potential as well as creating an entertaining environment for visitors to gain new knowledge.

However, policies that govern investment in museum activities are often guided by how the society values culture, and the economic impact of these activities. This is where economic valuation of cultural goods comes in to play an important role in policy decisions. Capturing the statistics of the cultural sector where the most of the core activities fall well outside the boundaries of economic approach to valuation is often a daunting task, and methods to measure value of cultural goods vary across the globe. This is mainly due to the fact that the economic valuation of cultural goods differs from classical market valuation in sense that these goods encompass much broader notion of value than national accounts definition.

Goods such as heritage spaces, sculpture and buildings are non-exclusive in their consumption; In other words, left to the market forces alone, these types of goods may suffer from under provision (or may stay uncared for) as each consumer can free ride off the other. This results in a market valuation far less than the aggregate of utility based on individual valuation of these goods. In recent years, various studies have developed methods to assess value of cultural goods so as to be able to guide policy decisions

regarding expenditure on preservation and maintenance as well as investment in new technologies and innovation.

Two main strands of methodology have emerged over years, namely, impact analysis method and contingent valuation method. Economic impact analysis provides a rule based and precise measure of economic activity generated by production of any particular goods and services. In other words, impact analysis with respect to any productive process seeks to quantify the economic activity generated in the local market as a result of the production. However, there are two main drawbacks of this method in the sense that it does not take into account the shadow values of the activities, and it fails to account for full range of benefits which arise from consumption and provision of cultural goods. Non market benefits such as externalities and public benefits are not factored into impact analysis. In spite of the inability to capture the full spectrum of benefits, the impact analysis method is the most transparent method to measure economic benefits of consumption and provision of cultural goods. The second method, the contingent valuation method, combines economic theory and survey techniques to elicit the value of public goods directly from consumers. Such surveys are designed to derive consumer preference patterns in case of public goods by asking them to specify a price at which they are ready to buy an incremental amount of the said public good. However, this method is rather unreliable as the specific valuations for the same goods may vary across agencies depending on formulation of the survey question, and may be misused by various advocacy groups.

In order to be able to perceive the expected economic effect the study uses the data of blind people visiting in Vienna Galerie Belvedere or Kunsthistorisches Museum and in Manchester the Manchester Museum and the museum statistics from the European Group on Museum Statistics (EGMUS) to calculate the economic impact of current museum visits as well as the expected impact if the inclusive technologies result in full participation from blind people at the same rate as the total population. Input-output-table was used to calculate the gross value added (GVA) created by blind visitors to the museums.

According to the data questionnaire, on average 3.11 Euro were spent by the blind persons in Austria on goods and services which they would not have consumed without visiting the museum. In the UK, these expenditures sum up to 1.02 Pound or 1.41 Euro. Additionally, the Galerie Belvedere and the Kunsthistorisches Museum spend on average 25.55 Euro per visitor. These costs are attributed to the visitors, not necessarily caused by them, and are thus an attribution in the sense of business controlling.

Researching annual reports of museums in the UK leads to particularly similar values. The weighted average of cost per visitor in the Manchester Museum, the British Museum, Tate Britain, and the National Gallery equals 18.74 Pound or 26.05 Euro. Costs for travelling to the museum and back again are estimated to be 9.12 Euro.

Summing up, an average blind persons travelling to and visiting the Galerie Belvedere or the Kunsthistorisches Museum in Austria stimulates economic activity worth 37.78 Euro. Within Austria, 19.87 Euro are turned into GVA directly, another 8.21 Euro are indirect GVA – thus creating GVA along the supply chain. The total GVA thus equals 28.09 Euro. An average blind persons travelling to and visiting the Manchester Museum stimulates economic activity worth 36.20 Euro equalling a total GVA effect of 29.83 Euro. Thereof 22.03 Euro are turned into GVA directly in the UK and 7.79 Euro are indirect GVA.

In order to compare effects in these high-income countries with other ones, the effects of blind and visually impaired visitors to the Muzej Suvremene Umjetnosti, MSU (Museum of Contemporary Art) in Zagreb, were calculated too. Even though the amounts are lower, they still remain comparable to the Austrian and UK figures, if one takes into account the GDP differences.

As per the input output calculations evaluating the economic climate as well as the survey results we have derived an estimated gross value added effect in all EU Member states. At the current rate of visits by blind people to museums, the Europe wide GVA stands at 2,317,296 euros. Given that these effects are generated in museums – which were in most cases created for seeing persons – by blind, these comparatively small values of economic effects are a positive by-product of the main purpose of the activity: the inclusion of blind and visually impaired people.

But in addition to monetary interpretation of socio-economic value of cultural goods, the role of cultural goods in promoting education and social cohesion has considerably influenced the policy making organs to adopt new technologies and to promote innovation in areas that will encourage participation across the society. Thus, museums as entities that are guardians of a cultural wealth have begun to make accessibility - in this case accessibility by disabled visitors – as one of the major points of focus. Developing learning resources, investing in technologies that enable the cultural heritage goods to be available to disabled population not only improves the rate of participation, but also gives rise to investment and innovation in new technologies. In 2003, European Year of People with Disabilities, the Council of the European Union adopted a resolution regarding increased accessibility of cultural

infrastructure and cultural activities for people with disabilities (2003/C 134/05). This resolution makes several policy recommendations to the member states in the field of improved physical accessibility to culture. It places special emphasis on cultural heritage sites, events and encourages inclusion of disabled through new technology and instruments.

The concept to develop museums into participatory institutions has taken shape during recent technological advances that have reshaped the mode of communication and participation in the artistic world. The advance in 3D technology has profoundly affected the rules of participation in museums and has changed the perception of educational content that museums provide to the society. The project AMBAVis that was carried out in consultation with partner museums and visually impaired people's associations, was developed with specific focus on blind and visually impaired people and their inclusion into museum visitors' base by introducing imaging 3D technology in museums.

According to a report published by WHO in 2012, there are around 3,000 blind and 28,700 visually impaired persons for every 1 million inhabitants in Europe. These figures were used to derive the number of visits by blind people that can be expected, in case of totally inclusive technologies. However, it should be kept in mind that these numbers are only estimates to project the increase in numbers of visits by blind and visually impaired people if the population proportions in the respective countries holds true for blind and visually impaired people. The total number of blind people in Europe, according to the study by WHO, stood at 1,450,030 in 2010 (if we include visually impaired people these numbers are 10 times higher). Using the survey the proportion of blind who visit museums was calculated to be 5.5% whereas in most countries museum statistics suggest that the proportion between number of visits and population is more than 100%. Thus the scope of inclusive policies is rather extensive.

We can safely assume that the GVA figures will increase substantially (to the tune of estimated 80 million euros accounted for by blind people and more than 2 billion euros if we include visually impaired people) with introduction and successful implementation inclusive technology. Thus 3D technologies have the potential of benefiting both the implementing institution and its users, but such a shift in service framework demands true commitment to a program that informs, educates and empowers the users. One can conclude that 3D technology is leading to emergence of a new dimension to the museums as well as to their relationship with the public. This scenario leads to, on the one hand, increased scope for everyone to get involved with museums, and a higher rate of innovation and learning in 3D printing technologies on the other.

This project (2014-1-AT01-KA204-001014) has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.