RICHES

RENEWAL, INNOVATION AND CHANGE:
HERITAGE AND EUROPEAN SOCIETY

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D5.3 Fiscal and Economic Issues in the Digital Age

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1. EXECUTIVE SUMMARY

The goal of Task 5.3 – *Economics of culture and fiscal issues* - was to provide an economic analysis of the impact of taxation, public support and private contribution to the production, distribution and consumption of cultural heritage and to improve understanding of the geography of cultural activities and ways in which fiscal policy can become more efficient in the age of digitization. We have done this through a thorough analysis in three steps. Firstly, we examined the fiscal policy for cultural goods across the EU Member States over time, secondly, we studied the current market of digital heritage and its ability to fuel innovation, and finally, we looked at the global use of European heritage content online. What follows is a summary of the three levels of analysis, with method and key results, to close with a proposal to improve efficiency of cultural activities in the digital market.

Fiscal policy for culture across EU Member States. One of the available and yet underappreciated tools in cultural policy at the national level is the reduction of VAT rates for cultural goods and services. We document the standard and reduced VAT rates in EU-28 countries in the period from 1993 to 2013 and explore the underlying determinants. We further introduce a simple theoretical framework to explain how reduced fiscal rates are expected to decrease prices and increase quantities of the consumed cultural goods and services. We then estimate quantitatively that a decrease in the VAT rate for books by one percentage point is associated with an economically significant drop in the price by 2.6 percent. Finally, we show the positive effect of a fiscal rate reduction on the book expenditure of well-off households, where a one percentage point decrease in the VAT rate for books leads to an increase in expenditure by 2.7 percent. Out of the analysis, we find that VAT rates are not related to the fundamental variables that determine cultural consumption – namely GDP, level of education and population size – but instead appear to be set following a different rationale beyond the stimulation of cultural consumption. Also, the Court of Justice of the EU recently ruled that VAT is to be set for carrier and not for content, where e-books are a service and therefore fall outside of VAT exemption. This appears in stark contrast to the substantial support and funding put into the improvement and promotion of Europe's digital cultural heritage.

Within a further strand, we construct and exploit also unique data recording the presence of classical music festivals, opera festivals, concert halls and opera houses. This data is used in order to approximate music consumption so that light can be shed on the association with fiscal reductions.

Current market of digital heritage to fuel innovation. Heritage institutions house cultural and research content, which is the key source to fuel innovation. Despite its potential, heritage collections are mostly inaccessible via digital mediums. We analyse the macro, meso and micro conditions of heritage organizations across Europe to find the key determinants that foster innovation as reflected by the share of collection digitization and online publication. We find that organizations respond positively to an environment of high consumer digital literacy and sustainable resource allocation that enables slack, skilled staff and long-term strategic planning. Innovation is thus, in fact, enhanced by digital literacy from both producers as well as consumers.

Use of European heritage content online. The *raison d'être* of memory institutions revolves around collecting, preserving and giving access to heritage collections. Increasingly, access takes place in social networked markets characterized by communities of users that serve to select and rank content to facilitate reuse.

Publication of heritage in such digital medium transforms patterns of consumption. We performed a quantitative analysis on the access to heritage collections at the National Museum of World Cultures in the Netherlands and compared results before and after publication on Wikimedia. Analysis of the difference in access showed two main results: first, access to collections increased substantially online. From a selection of the most viewed objects, access grew from an average of 156,000 onsite visitors per year (or 15.5 million in a century) to over 1.5 million views online per year (or 7.9 million in five years). Second, we find a long tail in both mediums but this broadens online, where 8% of objects were exhibited onsite and 11% of available objects online were used in Wikipedia articles (representing 1% of the total collection). We further found differences in consumer preference for type of object, favouring 3D onsite and 2D online, as well as topic and language preference, favouring Wikipedia articles about geography and in English. Online publication is hence an important complement to onsite exhibitions to increase access to collections.

Implications to for an efficient European cultural heritage digital market. Based on the research conducted, we can conclude the following three points regarding fiscal policy, private support and public contribution for the arts and culture in Europe.

1. The current fiscal policy to support heritage consumption, particularly the modality of indirect government support found in (reduced) VAT rates, can be made more effective if:
    a. designed in conjunction with and to mutually support cultural policy; and
    b. digital heritage based on content is considered, instead of carrier, in congruence with EC policy supporting digitization efforts.
2. Heritage institutions across Europe remain dependent on government funds to advance digitisation activities. Public support can facilitate an environment conducive of innovation when:
    a. directed towards long-term objectives and sustainable solutions, such as the construction of a digital heritage infrastructure, instead of short-term market driven goals; and
    b. responding to a policy (European, national, regional and/or institutional) that considers digital literacy and slack as core elements necessary to feed a content-rich digital European economy.
3. Consumers require and contribute to the European cultural heritage digital market. A heritage-rich digital market economy would benefit from:
    a. availability of collections onsite as well as online, as complements, particularly in forms conductive of reuse, such as digital image banks favouring creative commons attribution share alike (CC-BY-SA); and
    b. publication of content in existing infrastructures driven by active networked communities (such as Wikimedia), supportive of information curation beyond the selected experts.

As results indicate, and other tasks of the RICHES project have demonstrated, digital technology can support all segments of the cultural heritage market to position Europe as a competitive partner in the digital economy.

2. INTRODUCTION

2.1 BACKGROUND

Cultural consumption is associated with positive externalities. Those who read books, go to the theatre or attend music concerts, do not only increase their own utility, but generate also positive effects for the society, for example, in the form of improved education and literacy – these are examples of so called positive externalities. Welfare theory teaches us however that consumption of goods and services that incorporate externalities are inefficient. Therefore, the action of policy makers is required so that the right quantities are supplied and consumed from the view of a whole society. Otherwise, the socially optimum quantities will not be consumed by the individual, since she does not consider the overall societal gains (e.g., increased education or literacy) in her decision.

An economics textbook solution to this inefficiency is fiscal policy: by the means of taxes and subsidies, consumption of cultural goods and services can be steered so that efficient outcomes are obtained. There is however little understanding of these measures, especially of fiscal discounts in the European context, and there is also only limited agreement on whether these tools should be used. We focus on the case of books because of current policy developments. France and Luxembourg were two EU countries that introduced a reduced VAT rate also for e-books from 2012, at 5.5% and 3% respectively. This was done however without the Commission's approval and, as a result, the Court of Justice of the European Union ruled recently that e-books supplied via download or streaming are a service and therefore fall outside of the VAT exemption. The VAT rate is established based on the carrier and not on the content, resulting in a negative incentive for technologic development in Europe. This appears in stark contrast to the substantial support and funding put into the improvement and promotion of Europe's digital cultural heritage. It is hoped that the case for an enhancing role of VAT rate discounts on consumption of books provided here will contribute in future to related discussions.

Complementing fiscal policy, governments across Europe have funded the digitization of heritage materials through a number of grants, programmes and schemes. It has been estimated that cultural and research content held in European memory institutions has a market value of €27 billion. This represents "the biggest single information content resource for the creation of value-added information content and services" (Jancic, 2015:4). It has been also estimated that 17% of heritage collections have been digitized (Stroeker and Vogels, 2014). Memory institutions have not been able to fully adopt the digital technology in order to become part of the information economy (Navarrete, 2014a). This innovation gap has received little attention while the social expectation of heritage content positioned within the information economy grows. Heritage organizations, particularly libraries, archives and museums, are the keepers of most cultural and research content. They are generally non-profit organizations driven by goals related to providing access to collections in order to facilitate knowledge creation (Bakhshi and Throsby, 2012). Increasing and improving access to collections is an important driver for these organizations to adopt new technologies. Digitisation and publication of collections online can potentially allow access to content across the globe, and as such, liberate this untapped knowledge potential.

An important determinant supporting innovation is the presence of a clear policy for digital activities. One increasingly prominent question relates to the best practice approach to online publication to increase access to collections. The accent on how to ensure such accessibility and the quality of the engagement depend on the policy of the institution.

Digitisation has proven to be a key activity that supports the management and preservation of collections. It also increases access, as consumption broadens and deepens (Bakhshi and Throsby, 2012). With the aim of increasing digital access to heritage by positioning collections where the consumers are, a number of heritage institutions, including 25 from the Netherlands, collaborate with the Wikimedia Foundation, the online repository that feeds Wikipedia articles. Dutch heritage institutions have published over half a million objects in Wikimedia, representing close to 2.4% of all Wikimedia content (Brinkerink, 2015). Launched in 2001, Wikipedia has been ranked among the ten most popular websites on the Internet. The more than 35 million articles written in Wikipedia receive about 17 billion views per month, out of which more than 400 million are unique visitors.[1] Wikipedia's considerable traffic signals its position as highly preferred information site for online consumption.

This deliverable responds to the three identified voids, that of lacking clarity on the best approach for VAT to support cultural policy, that of missing evidence on the elements to foster innovation within the cultural sector in a digital market, and that of absence of understanding in the changes of consumption and consumer preference after digitization of heritage.

2.2 ROLE OF THIS DELIVERABLE IN THE PROJECT

The RICHES project is about recalibrating the relationship between the people of Europe and their Cultural Heritage. This considers the ways in which society is changing, especially in the digital era. The project considers both social and economic perspectives, this deliverable concentrates upon the latter.

This task has focused on identifying the directions to be taken to maximise the impact of cultural heritage to foster the economic growth in Europe, especially regarding innovation in a digital market. The evidence-based policies recommendations presented here are an effort to build best practice guidelines for a cultural rich Europe able to adopt digital practice and hence benefit from a broader and deeper cultural heritage transmission.

As part of a wider project, this deliverable builds on and supports the themes and work of other RICHES tasks.

The research presented in D3.1 – *Transformation, change and best practice for CH processes* – and D4.1 – *Europeana identity, belonging and the role for digital* CH - on the change brought about by digital technology in heritage institutions is complemented particularly by the quantitative context of digitisation across heritage institutions in Europe and in the digital market (section 4).

The results presented in D5.1 – *The use of craft skills in new contexts* - on the role of digital technology to support innovation in crafts, is echoed and reinforced by the analysis presented here in section 4: innovation is largely dependent on digital literacy of the producers (including craftsmen).

Section 5 includes a case study based upon the National Museum of World Cultures; a partner within the RICHES project.

[1] Views per month vary, the highest has been recorded at over 22 billion on September 2014 (http://stats.wikimedia.org/EN/TablesPageViewsMonthlyCombined.htm). For more on Wikipedia see https://en.wikipedia.org/wiki/Wikipedia.

2.3 APPROACH

In order to shed light on the changes brought to the production, dissemination and consumption of heritage through the increasing use of digital technology and to identify differences across Member States in Europe, we conducted a three-level quantitative analysis. Our goal was to isolate the impact of taxation and of private and public support on the digital heritage market. A three-level analysis permitted a sharp focus on three discreet subjects (books, heritage institutions, and digital images) and on three key elements (fiscal policy, digital heritage market, consumer preference) essential in the make-up of an efficient cultural policy for Europe. Such approach allows the delivery of practical and feasible results that, we hope, will be useful to inform future policy making.

Quantitative analysis was performed in the following three steps: firstly, we focused on the fiscal policy developments across Europe for the past two decades to identify the potential benefits or caveats of using VAT as a fiscal instrument to support cultural policy. We examined the correlation of VAT rates across EU Member States over a period of time, and the relations between VAT and prices, and expenditure (see section 3.6 for a detailed explanation). Results inform the impact of taxation on the heritage market. Secondly, we analysed the current heritage market and its response to the adoption of digital technology in order to single out the conditions that support or inhibit innovation. Results inform the impact of public support on the heritage market. For that, we studied the level of digitisation, adoption of a digitisation policy and the use of the heritage collections (see section 4.4). Finally, we analysed the changes in consumption as heritage is made available onsite (i.e. museum visit) and online (i.e. on Wikipedia) to better understand the impact of adopting a digital distribution and consumption practice. Results inform the impact of private support on the heritage market. For this, we compared the access to objects (through object mobility and their visibility) both onsite and online and identified the observable consumer preferences (see section 5.4).

The quantitative analysis is based on the following eight datasets: (1) the VAT rates applied in the EU Member States covering the period from 1993 to 2014 (Taxations and Customs Union); (2) data on prices of cultural goods for the period 2003 to 2013 (ERICarts Compendium of Cultural Policies and Trends); (3) socio-demographic statistics for the period from 1993 to 2013, including population size, GDP per capita and educational attainment (Eurostat); (4) the political orientation (World Bank); (5) the state of digitisation at European heritage institutions in 2013 (ENUMERATE); (6) individual use of the Internet in 2013 (ITU); (7) collection exhibitions and museum visitor numbers from 1911 to 2010 (annual reports and TMS collections management system from the Dutch National Museum of World Cultures); and (8) online views to individual images (Wikimedia Foundation).

2.4 STRUCTURE OF THE DOCUMENT

This document is organised as follows:

Section 3 outlines the careful analysis of fiscal policy, with focus on the book, and its impact on consumption and expenditure across Europe.

Section 4 present the current state of the digital heritage market and the country conditions that influence innovation.

Section 5 describes the changes in access (object mobility and visibility) and consumer preference observed on heritage collections after becoming digitized.

Section 6 highlights the main results and implication to inform an evidence base for future heritage policy in Europe.

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3. FISCAL AND ECONOMIC ASPECTS OF CULTURAL CONSUMPTION IN THE EUROPEAN UNION

3.1 INTRODUCTION

Cultural consumption is associated with positive externalities. Those who read books, go to the theatre or attend music concerts, do not only increase their own utility, but also generate positive effects for the society, for example, in the form of improved education and literacy. Welfare theory teaches us that consumption of goods and services that incorporate externalities leads to dead-weight loses: markets do not internalize externalities and thus to not trade the efficient quantities. Therefore, the action of policy makers is required so that the right quantities are supplied and consumed. An economics textbook solution to this inefficiency is fiscal policy: by the means of taxes and subsidies consumption of cultural goods and services can be steered so that efficient outcomes are obtained. There is however little understanding of these measures, especially of fiscal discounts in the European context, and there is also only limited agreement on whether these tools should be used.

This paper attempts to fill this void by documenting fiscal rates across the EU Member States over time, including rates for cultural goods, by analysing the local context (i.e., population, GDP). The goal of this paper is to improve our understanding of fiscal rates for cultural goods and services, with a particular focus on books. This is done by documenting discounted VAT rates across EU Member States from 1993 and by illuminating the effects of fiscal incentives on the prices of selected cultural goods and services and on the cultural expenditure of households on books. Tax literature has raised concerns on the efficiency of value added tax (VAT) for culture as it is considered “expensive and poor targeted means of addressing distributional concerns” (Borselli, et al., 2012:14). As an indirect subsidy, VAT is less visible as it is not formally discussed in parliament (Hemels, 2009). These concerns become more critical with the expansion of international online markets and as new Member States homogenize fiscal practices. The reduced rates, as a whole, are regarded as a revenue loss of up to 1.7% of the share of GDP (CE, 2007). Arguments to support the implementation of a VAT rate for culture focus on the positive externalities that come with cultural consumption (EC, 2014; Frey, 2008). By consuming culture, self-interested individuals provide benefits to society as a whole, be it in the form of improved education or literacy (Krashen, 2012) or as higher consumption of goods and services offered during cultural consumption (e.g., purchases in the museum café) (Plaza, 2000). Reduced VAT rates for culture are a significant cost and as such are included as tax expenditure in national budgets (O’Hagan, 2003).

An important international comparative analysis on fiscal policy to support the arts was conducted more than three decades ago and focused on tax breaks in the United States (Feld et al., 1983). The model of tax concessions for cultural goods and services in Europe is introduced and analysed economically in an insightful study by O’Hagan (1998). Recent publications on cultural VAT rates include country analysis to estimate consumption as a result of changes in the fiscal policy (Gesko, 2013; Hjorth-Andersen, 2000; MvF, 2014; Prieto-Rodriguez et al., 2005; Ringstad and Løyland, 2006), to focus on the nature of the policy (Campbell, 2013; Colbjørnsen, 2014; Hemels, 2009), or to estimate the revenue raised by the VAT (O’Hagan, 2003). Publications on the relationship between pricing and cultural consumption remain dissociated from VAT rate policy.

This deliverable contributes to the body of work on the economic analysis of fiscal policy by comparing the VAT rates in all EU Member States for the last two decades and by adding country specific determinants to the analysis of cultural consumption. That is, we not only analyse the changes in VAT rates and their effect on book prices in time, but we also examine the association with cultural consumption. Specifically, we look at the standard and reduced VAT rates for cultural goods in EU Member States from 1993 to 2014. Since VAT rates are part of a national tax policy, not all Member States have the same reduction on specific types of goods and services, and most, but not all, countries have introduced reduced rates in different years. These geographic and temporal variations offer a very convenient setting that can be exploited quantitatively; in doing so, we shed light on the determinants of fiscal rates. One key finding is that the VAT rates are not related to the fundamental variables that determine cultural consumption - namely GDP, level of education and population size - but instead appear to be set following a different rationale. This seems to question the notion that cultural tax discounts are used to stimulate cultural consumption. The paper also explores how reduced cultural rates affect book prices and household expenditure. Indirectly, our results contribute thus to research on price elasticity in the arts. We show that these associations are in accordance with theory and demonstrate also that an increase in VAT rates for books has a causal influence on book consumption.

The book angle is also particularly interesting in light of current policy developments. France and Luxembourg were two EU countries that introduced a reduced VAT rate also for e-books from 2012, at 5.5% and 3% respectively. This was done however without the Commission's approval and, as a result, the Court of Justice of the European Union ruled recently that e-books supplied via download or streaming are a service and therefore fall outside of the VAT exemption. The VAT rate is established based on the carrier and not on the content, resulting in a negative incentive for technologic development in Europe. This appears in stark contrast to the substantial support and funding into the improvement and promotion of Europe's digital cultural heritage. It is hoped that the here disclosed enhancing role of VAT rate discounts on consumption of books will contribute in future to related discussions.

At the EU-level, decision-making on cultural fiscal rates is conducted by the fiscal unit, which is likely to have divergent aims and priorities from those of the cultural unit. The extended period considered here allows for a potentially rich insight into policy analysis and, in this way, we bridge the gap found between fiscal policy and cultural policy. It is hoped that results from this analysis will contribute not only to the research on public economics (fiscal studies) and cultural economics, but also to fiscal policy, particularly regarding the use of tax discounts as indirect support to the arts across EU Member States.

This section is organised as follows. Section 3.2 introduces VAT as an instrument used to collect revenue and as a policy tool to incentivise a desired behaviour. Section 3.3 reviews the empirical studies in Europe aimed at documenting the change in prices and in consumption brought on by a reduced or increased VAT rate. Section 3.4 presents the theory, followed by section 3.5 where the data is presented. In section 3.6 we describe our analysis. Section 3.7 extends the analysis to other cultural domains, and utilises unique geographic data for music heritage and festivals. Section 3.8 concludes and proposes future research.

3.2 GOVERNMENT FISCAL SUPPORT FOR CULTURE

Governments support the production, distribution and consumption of arts and culture through direct financing, generally in the form of grants and subsidies to organizations and sometimes through consumer vouchers. An alternative form of government support is defined by tax policies in the form of indirect subsidies, of which two common examples include tax deductions for private supporters of the arts and culture or the reduction of the VAT rate for cultural goods and services (O'Hagan, 1998; Linklater, 2014; Hemels, 2005).

VAT is first of all a form of revenue collection by the government (Schuster, 2006), accounting for an average of 7.9% of the GDP and 22.3% of total fiscal revenue in the EU in 2012 (Eurostat, 2014:179-180), whereby a tax is collected every time value is added to the production process of a good or a service. Successive taxpayers can further deduct input tax on purchase while reporting output tax on sales, so that finally the tax collected by the tax authorities should equal the VAT paid by the final consumer to the last vendor. VAT collection, as other tax forms, can also have an auxiliary or subsidiary function such as redistribution of wealth or influencing market behaviour (Hemels, 2009). A reduced VAT rate thus represents a decrease in government revenue that could otherwise be allocated to support the non-profit sector and increase equity of services. Instead, it is the consumer who actually decides how resources are being spent when selecting specific goods or services with a lower VAT rate; for instance, in the case of cultural goods or services.

As indirect subsidies work as an incentive towards a desired behaviour by lowering the tax rate (or as a disincentive for consumption by setting a higher tax rate) (Schuster, 2006), governments can reduced the VAT rate to encourage an increase in the demand for specific goods. An increased consumption of books, for instance, due to a discounted VAT rate would further deliver positive externalities associated with education and literacy. However, and because of their indirect nature, reduced VAT rates cannot be specifically directed towards a desired good (e.g., all books receive a reduced VAT rate), provider (e.g., all public and private producers), or consumers (e.g., all genders, ages and socioeconomic background). In this way, reduced VAT rates have been criticized for being an ineffective means to support cultural consumption, particularly as it ignores the consumer's ability to pay. However, the fact that each EU Member State can choose to reduce VAT for one or another good makes it an important element in the national cultural policy (Appendix 2.1 provides further details on the VAT Directive of the European Union).

The government bodies that define the fiscal policy in a country are not the same as those which set the cultural policy. This results in a cultural policy defined by a fiscal logic (Schuster, 1987 (2006 in reference list)). The fragmented approach to defining VAT rates as part of a national policy, particularly when including digital culture, has recently been criticised: "Newspapers are commonly placed within a *media policy* sphere, whereas books (print and digital) are typically treated within a *cultural policy* framework. Moreover, policy frameworks for media business and technology development are often seen in light of *competition and innovation policies*, thus evoking a different set of policy aims and motivations" (Colbjørnsen, 2014:4).

3.3 REDUCED TAX RATES IN THE EUROPEAN UNION

What follows is a revision of empirical research on the effect of a change in the VAT rates.

3.3.1 General VAT – revenue estimations

VAT is a system by which the state gathers resources. In 2012, the countries of the EU-28 reported collecting 22.3% of their total taxation through VAT representing an average of 7.9% of their total GDP (Eurostat, 2014).

The rationale to lower the VAT rates for cultural goods is often based on a *merit good* argument, where the government intervenes by giving indirect support to broaden demand (CE, 2007). There are further rationales to lower VAT rates. In the Netherlands, books receive a reduced VAT rate on the basis of their cultural and educational value, and therefore educational books on CD-ROM and DVD also have a lower VAT rate (6%) (Hemels, 2007). However, books on tape and downloaded e-books have the regular VAT rate (21%) (Belastingdienst, 2014). Similarly, Slovakia reduced the VAT rate on books in order to increase the production and consumption of literature in the national language and so improve the overall educational level (Gesko, 2013) while Sweden reduced their VAT to lower prices and promote readership, quality of books and variety of content (CE, 2007). Increasing equal access goods and services, particularly to lower income groups, is also an argument for a reduced VAT rate (Linklater, 2014; Borselli, 2012), though a VAT cut confers a greater (proportional) benefit on wealthier households because they consume more to begin with (Crossley et al., 2009:13; Blundell, 2009; Dallongeville et al., 2010; Hemels, 2005).

3.3.2 Supplier behaviour – passing on the cost reduction to consumer prices

A lowering of the VAT rate would lead to a lowering of the price due to a reduction in the cost to the supplier. This was the case in Sweden, where a reduced VAT rate for books from 25% to 6% led to a decline in book prices of 16% after one year and 80% in the long run (CE, 2007:82). If the change is not passed on to the price, the benefit will appear in company profits, rather than in the consumer's disposable income. However, the provider does not always pass on the cost reduction to the consumer, particularly when the VAT reduction is perceived to be temporary (CE, 2007). For example, a lower tax rate established in Germany for the hotel industry in 2010 did not lead to lower bed fares (Lomas, 2010).

An increase in the VAT rate for theatre tickets in the Netherlands from 6% to 19% led to an increase in prices (representing a consumer price index increase from 124 to 140); in some cases before the actual VAT rate change. A year later, the VAT rate was changed back to the original reduced rate (6%), yet prices did not decrease accordingly (the consumer price index changed from 137 to 134) (Statistics Netherlands, 2015). A follow-up study conducted by the Dutch Ministry of Finances found that the 12.3% price increase resulted in a 3.9% reduction of ticket sales in the short term, and a 4.5% reduction in the long term. The decrease in demand, according to the study, was found to be part of the general economic recession that started in 2008, rather than a direct result of the short-term change in VAT (MvF, 2014).

In Slovakia, a VAT rate reduction for books in 2007 did not result in a lower book price, as observed by Gesko (2013). The VAT rate reduction (from 19% to 10%) did not lead to an increase in consumption because, as Gesko argues, the overall household income was relatively low, the VAT rate decrease was relatively small, and the share of expenditures on books compared to other goods was low, even if there were not relevant substitutes for books at the time. Book prices, instead, rose at a higher rate than inflation.

Labour intensive services tend to change prices more dramatically when the VAT is increased, according to Carbonnier (2005). This is because decreasing production in order to accommodate to a higher price is much easier than increasing production in response to a lower VAT. As an example, Carbonnier compares the prices of books and home repair services around the 1999 and 2000 French VAT reforms. Though book prices did change accordingly, the change was less dramatic than for labour intensive services. These findings may be relevant when used to analyse labour intensive cultural activities.

Prices for books, argue Franssen and Velthuis (2014), continue to be largely determined by genre as a *rudimentary* measure of quality and by the material qualities of number of pages, binding and size of the book. Prices are set not by production cost (a run of 3,000 books cost €1.64 per book) but by expectations in the market. Their historical analysis did not mention the changes in VAT rates for books in the Netherlands.

3.3.3 Consumer behaviour – responding to a price change

Government intervention in the form of a VAT rate change in the long-standing EU Member States has an overall impact on consumption. Increases in consumption following the VAT change in six countries showed that a higher VAT rate would lead to a decrease in consumption (Blundell, 2009).

When comparing the change in demand as a result of a reduced VAT rate or the distribution of vouchers (e.g., food stamps), a study found that a lower VAT rate was the most effective instrument. The study developed an economic model that estimated an increase in demand following a VAT rate reduction on fruits and vegetables from 5.5% to 2.1%. The lower consumer price led to an increase in consumption, and the extent of the effect depended on the initial level of consumption and on the price demand elasticity, so low-income consumers benefited less. In contrast, vouchers increased consumption only on the targeted population (Dallongeville et al., 2010).

Studies on consumer response to changes in the price of cultural goods are very rare and typically restricted to analyses of single countries. The only study that has explicitly linked fiscal issues and cultural consumption, of which we are aware, is by Prieto-Rodriguez et al. (2005). The authors focus on Spain and find that a 1% change in household expenditure results in a 1.75% change in cultural goods expenditure, while expenditure on books changes by 1.37%. Contrary to expectation, books were found to be complementary to performing arts and other cultural goods. Prieto-Rodriguez et al. (2005) also found that more welfare was gained with a VAT rate decrease, especially so for the population with a higher socioeconomic level. The income elasticity for books in Spain was found to be 1.65. A similar result was found in two studies of the book market: in Denmark the income elasticity was 1.97 (Hjorth-Andersen, 2000) and in Norway it was 1.3 (Ringstad and Løyland, 2006). The price elasticity was found to be well below -1 across all three studies.

A study of the Norwegian book market further found that geographical access to paper books influenced the likelihood of consumption, so that big cities with many bookstores had a higher demand. Households with children 7 through 19 years old, single person households or households with a higher income were more likely to buy books (Ringstad and Løyland, 2006). Canoy et al. (2006) report a similar result where countries with a higher number of public libraries had a higher number of book loans and higher percentage of reading popularity. Canoy et al. (2006) focus on book title production and conclude that the book industry does not need government intervention, though possible instruments include special VAT rates for books, prizes and grants for authors, and support to public libraries.

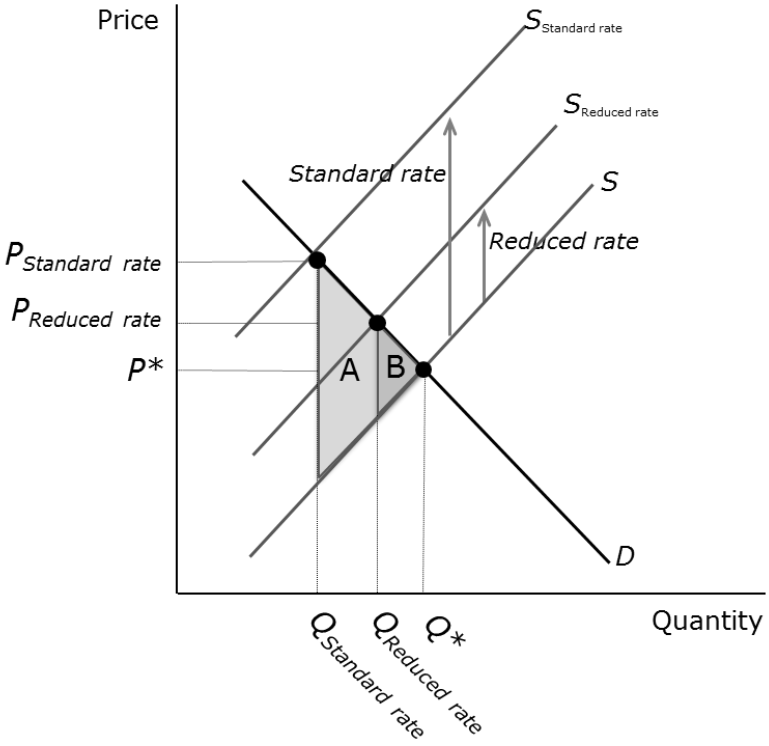
Cultural demand is typically found to be driven by three fundamental determinants (e.g., Borowiecki, 2012): the size of demand (usually measured in relation to population size), the purchasing power (approximated with wages or GDP per capita indicators) and human capital (i.e., the level of education). The level of education is an important determinant for book demand (Canoy et al., 2006), even stronger than income, though the effects of the two variables are not easy to separate (Seaman, 2006). Other determinants, such as age, gender, past exposure to the cultural form, lifestyle determinants and ethnic background are not consistently found to determine consumption across empirical studies, according to an overview of applied research on cultural demand conducted by Seaman (2006). Political affiliation, as an alternative determinant, is found to have little effect on the reading behaviour in Russia (Zavisca, 2005).

3.4 THEORY

The effect of a tax reduction on the price and quantity of a good in a competitive market is shown in Figure 3.1 In a tax free world, the intersection of the supply and demand functions deliver the efficient equilibrium quantity Q^* and price P^* of the good consumed. Imposing a standard VAT rate on a good or service shifts the supply curve upwards, increasing the price to $P_{standard\ rate,}$ decreasing the quantity to $Q_{standard\ rate}$ and creating a welfare loss of the size of the shaded areas A and B. The welfare loss exists because there are certain quantities which the supplier would be willing to produce and the customer would be willing to pay for (i.e., where the demand function lies above the supply function), but these quantities are not exchanged because of the price distortion created by the fiscal burden. Lowering the standard tax rate to the reduced rate will shift the supply curve downwards towards the efficient equilibrium. A fiscal reduction results in a decrease in the price to $P_{reduced\ rate}$ and an increase in the quantity to $Q_{reduced\ rate}$ and leads to a lower welfare loss to society (area B only).[2]

[2] Changes in demand are determined by (1) the existence of substitutes, (2) the level of disposable income, (3) the share of expenditure on a good, (4) the size of the tax change, and (5) the nature of the need for the good (e.g. imposed demand as in

FIGURE 3.1 The impact of tax on price and quantity



3.5 DATA SOURCES AND PRELIMINARY OVERVIEW OF THE DATA

This research is based on data obtained mainly from four sources. Firstly, VAT rates applied in the EU Member States are obtained from the European Commission Taxation and Customs Union. The available data covers the period from 1993 to 2014 and constitutes the core of the fiscal data. Member States report the standard and reduced rates for a wide range of goods and services. When multiple reduced rates were reported, the lowest for a given category was used.

Secondly, data on prices of cultural goods for the period 2003 to 2013 are obtained from the ERICarts Compendium of Cultural Policies and Trends (Compendium, 2015). This series documents the regular price of a specific cultural product, for example a best-selling book, across countries.

Thirdly, Eurostat statistics are used as the source of socio-demographic data for the period from 1993 to 2013, which includes population size, GDP per capita and educational attainment. We also obtain records on household expenditure from the latest available Eurostat Cultural Statistics (2011). In some analyses, we avail ourselves of the Eurostat Community Survey on ICT usage in households and by individuals in 2008 (Eurostat, 2015). These records are used to analyse the relation between VAT book rate and Internet commerce for books.

Finally, we use World Bank data on political orientation (Keefer, 2012). This appears to be the dataset that best enables comparison across multiple Member States. Below is an overview of the data analysed.

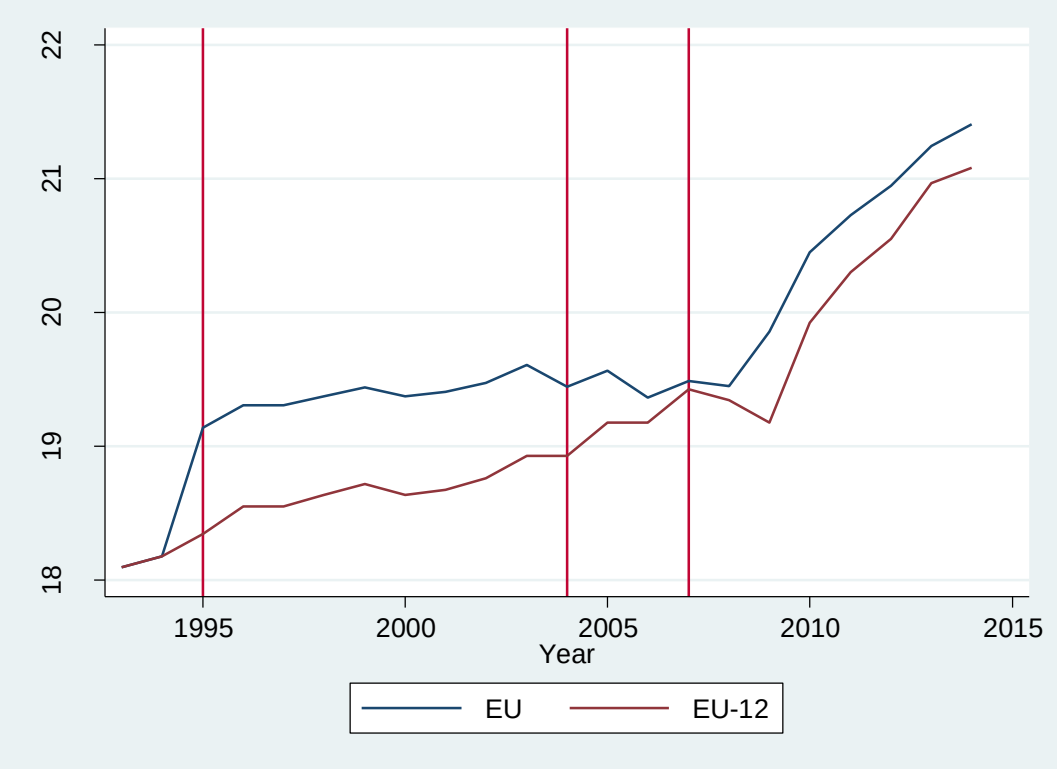
Table 3.1 shows a summary of the underlying data, including fiscal rates, prices of cultural goods and services and basic socio-economic control variables. In the countries and years covered, the mean VAT standard rate is found at 19.8%, while the VAT rate for books is 7.1% and the VAT rate for admission to cultural services is 6.8%. The mean price is 21 euros for a book, 7.5 euros for a film ticket, 6.4 euros for a museum ticket, and 41.8 euros for an opera ticket. During the time period covered, the Member States have a population size of 16.1 million on average, a GDP of around 23,470 euros per person, and around 64.5% of their population aged 15-64 has medium or high educational attainment.

Table 3.1 Summary statistics

Variable	Observations	Mean	Std. dev.
Standard VAT rate	450	19.84	2.83
VAT rate for books	450	7.08	6.01
VAT rate for admission to cultural services	447	6.76	7.45
Left-wing party	359	0.40	0.49
Log (population)	423	16.06	1.44
GDP per capita	416	23.47	13.01
Share of medium or high educational attainment (ages 15-64)	416	64.47	15.61
Price of book	170	21.01	7.84
Price of film ticket	182	7.49	2.40
Price of museum ticket	174	6.45	3.63
Price of opera ticket	180	41.80	30.15

A first analysis was conducted to compare the changes in general VAT rates and reduced VAT rates for books across Member States. Figure 3.2 shows the average standard VAT rate for the EU (see country specific figures in Appendix 2.2). The standard VAT rates are shown in the blue plotted line for the EU-28 and in the red plotted line for the EU-12. The red vertical lines mark the growth of the EU: the enlargement to EU-16 in 1995 with the accession of Austria, Finland and Sweden, followed by the EU-26 in 2004 with the accession of Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia, and culminating in the current EU-28 from 2007 with the accession of Romania and Bulgaria. The overall increasing trend can be related both to the accession of Member States and to increases within countries.

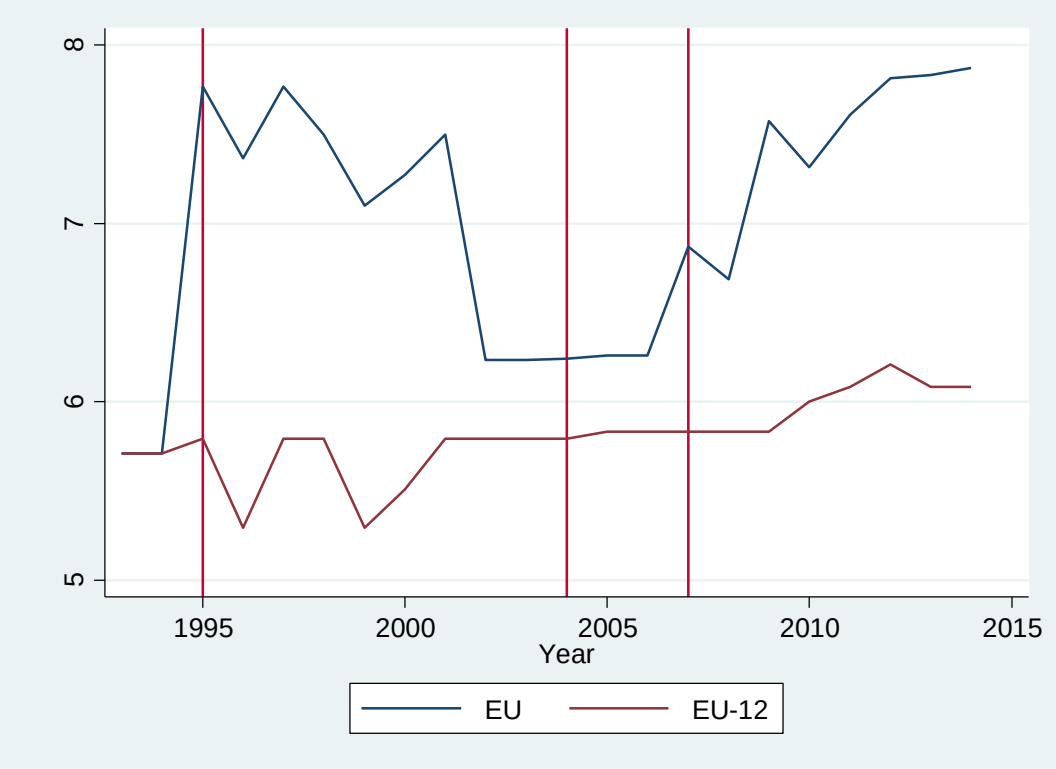
FIGURE 3.2 Standard VAT rate, average



Note: Vertical lines mark the years of accession of new Member States to the European Union. For sources, see text.

The average VAT rate for books in the EU is shown in Figure 3.3. The red plotted line represents the EU-12, with a relatively stable VAT rate for books, while the blue plotted line includes the current EU of a given year. The average for all Member States increased after the 1995 enlargement, which later gravitated towards the average of the EU-12. Since then, the trend has been rising due to both accessions of countries that had relatively high VAT rates for books and to increases in individual countries.

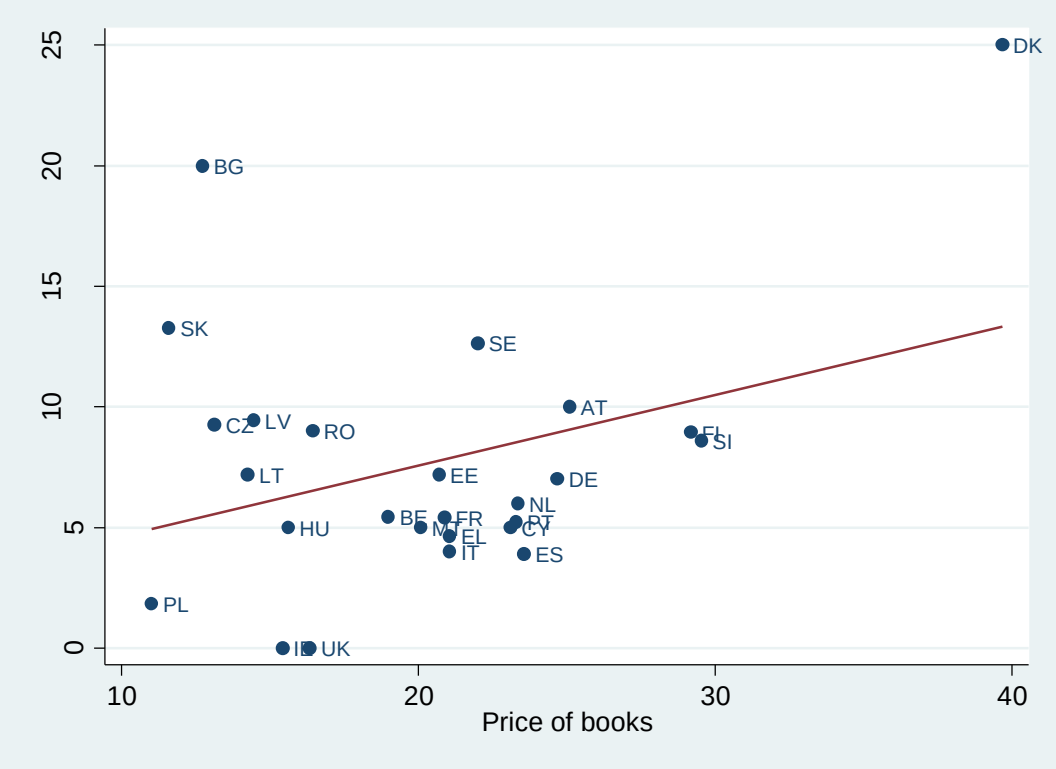
FIGURE 3.3 VAT rate for books, average



Note: Vertical lines mark the years of accession of new Member States to the European Union. For sources see text.

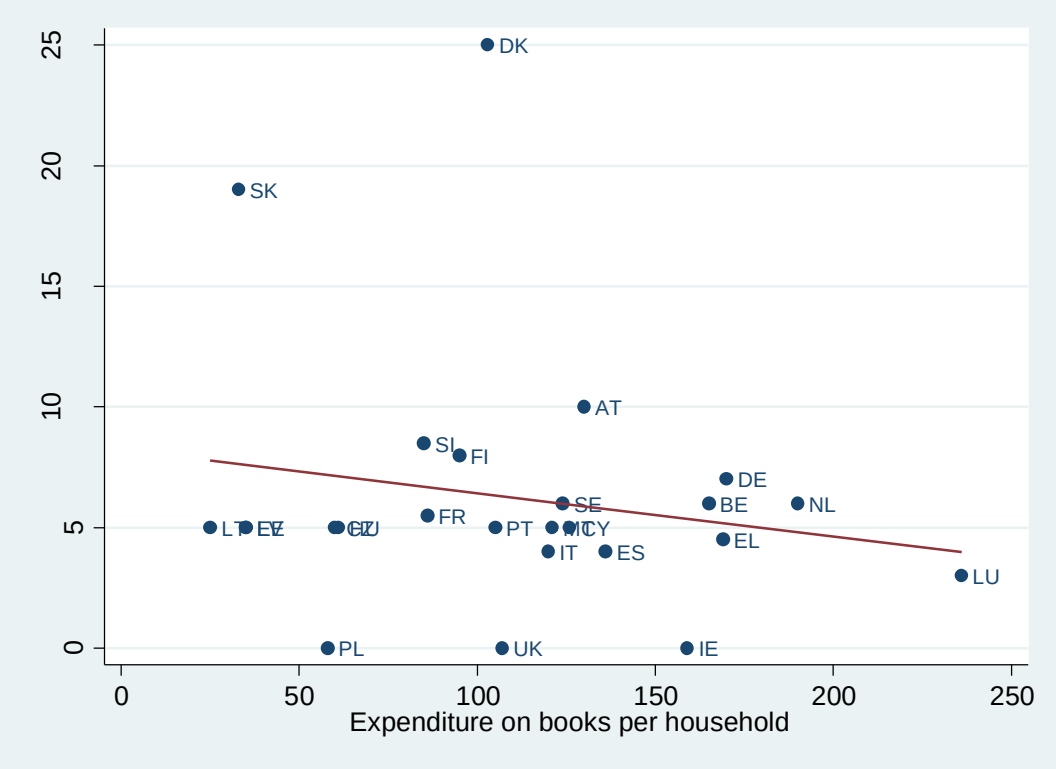
Next, we visualise the correlation between VAT rates for books and prices in Figure 3.4. Since the price data is not available for the same extended time period as the fiscal rates, the correlation is shown for the years from 2003 to 2013 only. The association is found to be positive: countries with a higher VAT rate for books have higher book prices in general. The Nordic countries (Denmark, Sweden, Finland and Norway) have the highest rates and also prices – thus appearing in the upper right segment. The UK and Ireland appear at the other end of the spectrum, having the lowest rates and also rather low prices. This may partially be due to the market size of books in English, compared to other European languages. Central, Western and Southern Europe exhibit about average prices and mid-range tax rates, with the latter ones (Italy, Cyprus, Portugal, Spain and Malta) having tax rates typically below those of most of Central Europe (Austria, Germany, Netherlands) and France. The Eastern part of the EU (most of the accession members of 2004 and 2007) exhibit the lowest prices, which is more likely due to the comparatively low economic welfare in those countries; however, fiscal rates are rather widely spread, with Bulgaria and Slovakia being the outliers in terms of high rates, while Poland and Hungary exhibit below average rates.

FIGURE 3.4 Prices and VAT rate for books average for 2003-2013, by country



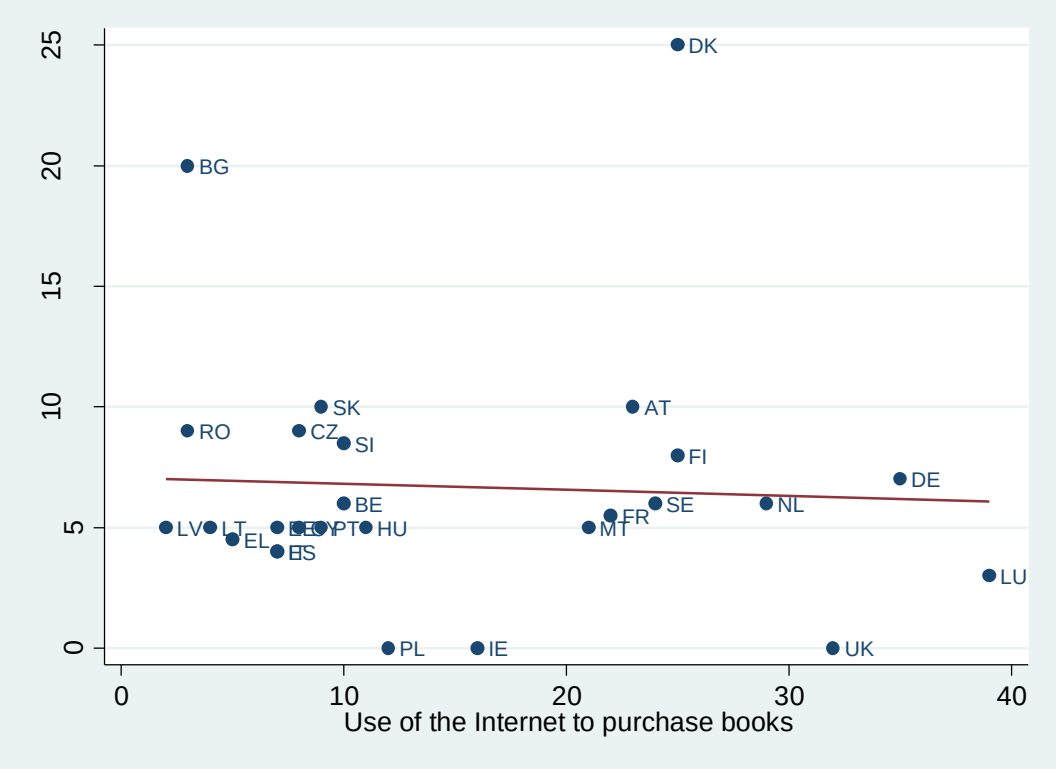
We turn next to a comparison of VAT rates for books with household expenditure on books by country. The correlation shown in Figure 3.5 is estimated for the year 2005, the most recent year for which book expenditure is known. The association is negative implying that household expenditure on books is increasing as the VAT rate for books decreases. The appendix contains a country specific figure where we see some geographic variation (see Figure 2.3.A1). Some Central European countries (Luxembourg, Germany, Netherlands, and Belgium) exhibit the highest expenditure in the range of 170-240 euros per household in 2005. Southern Europe and France have rather similar expenditure patterns to the Nordic Countries (however, here we have Denmark with a very high VAT rate of 25%). The Baltic countries, Poland, the Czech Republic and Slovakia show the lowest household expenditure.

FIGURE 3.5 Expenditure on books per household and VAT rate for books, 2005, by country



Contrary to expectation, Internet commerce shows an insignificant correlation (see figure 3.6). Books have become an important segment of the online market, and Internet retailers can offer over two million book titles to consumers who increasingly benefit from online product reviews (Benhamou, 2015). It was expected that online consumers would respond positively to lower VAT book rates, but results may reflect other variables such as Internet penetration, digital literacy, diversity of demand or title availability in a particular language. This may change as the market for e-books grows in Europe and as the VAT for e-books is set to match the paper counterpart.

FIGURE 3.6 Use of Internet to purchase books and VAT rate for books, 2008, by country



The presented graphical illustrations appear to be consistent with theory and allow an intuitive interpretation of the main patterns. However, the correlations could be biased due to the many unobserved differences across countries and over time. Furthermore, a correlation does not imply a causal relationship. Therefore, we next turn to a more formal, econometric exploration of the data.

3.6 RESULTS

In this section we present the analysis of VAT rates in three parts. Firstly, we explore what are the determinants of VAT rates. Secondly, we study the association between VAT rates for books and book prices. Thirdly, we analyse the effect a lower VAT rate may have on the book expenditure of households.

3.6.1 Correlation of VAT rates

We first estimate a simple model, in which we explore the correlation of various types of the standard and reduced VAT rates for cultural goods and services. The estimations include the previously introduced key socio-economic variables that determine cultural consumption: population size, wealth of a country measured according to GDP per capita and educational attainment.

We use a linear regression model that includes both year and country fixed effects in order to capture unobserved differences over time as well as across countries. The results for the standard and a set of reduced VAT rates for cultural goods and services are shown in Table 3.2. Countries with a high GDP per capita, with larger populations or a low level of education tend to have a low standard VAT rate (column 1).

Table 3.2 Determinants of VAT rates, EU 1993-2013

	(1) Standard rate	(2) Books	(3) Newspapers	(4) Periodicals	(5) Admission to cultural services	(6) TV license	(7) Supplies by creators
Log (population)	-8.504***	-8.191	-29.32***	-30.52***	5.189	15.37	0.831
	(1.913)	(5.324)	(4.373)	(7.193)	(9.047)	(9.851)	(6.643)
GDP per capita	-0.0576***	-0.0244	0.126***	0.0691	0.0753	-0.0208	-0.0688
	(0.0160)	(0.0444)	(0.0365)	(0.0600)	(0.0754)	(0.0770)	(0.0668)
Share of medium or high educational attainment (ages 15-64)	0.0469***	0.149***	0.0745**	0.174***	-0.383***	-0.0979	-0.165**
	(0.0159)	(0.0441)	(0.0362)	(0.0596)	(0.0751)	(0.0754)	(0.0702)
Year FE	yes	yes	yes	yes	yes	Yes	yes
Country FE	yes	yes	yes	yes	yes	yes	yes
Observations	409	409	409	409	406	366	313
R-squared	0.906	0.852	0.843	0.796	0.696	0.823	0.864
Number of years	21	21	21	21	21	21	14

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In this table, we also explore whether the setting of VAT rates for cultural goods and services is governed by similar fundamentals across countries. We illustrate the correlates for VAT rates for books (column 2) as well as for other cultural goods: newspapers, periodicals, admission to cultural services, TV license and services by writers, composers and performing artists (columns 3 to 7, respectively).

The only significant correlation found for the VAT rate for books is with educational attainment and, interestingly, the point estimate is positive. This is possibly attributable to the fact that countries with a higher educational level do not need a stimulus for the consumption of books and can therefore set a higher VAT rate. Such is the case of Denmark, where books have no reduced VAT rate and instead universities receive a refund of the paid VAT (Hemels, 2009). The reduced VAT rate, which is arguably a measure to increase access to books and improve literacy or education (Canoy et al., 2006), is not required in well-educated countries. The associations between the VAT rate for books and population or wealth are insignificant.

Higher fiscal rates also apply to newspapers and periodicals in better educated countries, or in smaller and poorer countries. However, in countries characterised by high educational attainment VAT rates are lower for admission to cultural services and for services by writers, composers and performing artists.

The emerging results are interesting. While VAT rates are related to the fundamental socio-economic variables employed (population size, wealth and education), there is no clear pattern found in relation to most of the cultural fiscal rates. The small, albeit important, set of regressors does not exhibit any clear, consistent associations across the different cultural goods and services.

This suggests that these VAT rates are set independently from the fundamental drivers of cultural consumption, or that these rates are governed by other unobservable factors.

This is obviously a basic model that considers only the fundamental determinants of cultural consumption, and not a range of other socio-economic variables whose inclusion would be arbitrary and difficult to motivate. However, one may be concerned about the role of politics in the tax setting decisions. In particular, the use of a consumption tax policy to redistribute resources has been linked to left-wing political parties (Beramendi and Rueda, 2007). Therefore, in a robustness test we control for the party orientation with respect to economic policy. We include a dummy variable that takes the value one if in a given year the country was governed by a left-wing party (as defined by Keefer, 2012), and zero otherwise. The additional variable is intended to account for the fundamental difference in political attitudes towards fiscal regulation across the political spectrum.[3] The results of this test are presented in Appendix 2.3. The point estimates for the fundamental determinants are very consistent in sign and typically also in size and statistical significance level.

3.6.2 VAT rates and prices

Next, we turn to an estimation of the relationship between prices of cultural goods and fiscal rates, and present the regression results in Table 3.3. The available data allows us to study these associations for books (column 1) as well as for museum, opera and cinema tickets (columns 2 to 4, respectively). Since the utilised price series is available only for the period 2003-2013, the regressions are based on a somewhat lower number of observations. Again, the models include year and country fixed effects; the former are particularly important in this case, since the price series for each year is based on a different product (the same one across countries, however). Year fixed effects thus account for the unobservable differences across these specific products.

Table 3.3 Reduced VAT rates and prices, EU 2003-2013

	(1) Book price	(2) Museum price	(3) Opera price	(4) Cinema price
VAT rate for books	0.504*			
	(0.260)			
VAT rate for admission to cultural services		0.0685*	0.570**	-0.0187
		(0.0380)	(0.242)	(0.0303)
log(population)	1.026	0.290	155.4***	13.02**
	(1.285)	(1.442)	(48.56)	(4.134)
GDP per capita	0.643***	0.597***	2.875***	0.341**
	(0.160)	(0.166)	(0.611)	(0.107)
Share of medium or high educational attainment (ages 15-64)	-0.455***	0.164	-0.391	0.0561
	(0.101)	(0.202)	(0.467)	(0.0716)

[3] We have also tried to estimate the political spectrum in other ways, for example, by controlling for right-wing parties as well. In Denmark, for example, right-oriented political parties favour less taxation as an indirect form of welfare reduction, according to Klitgaard (2014).

Year FE	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Observations	169	172	178	180
R-squared	0.692	0.735	0.858	0.760
Number of years	10	10	10	10

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The point estimates are positive and statistically significant for the case of books, museum tickets and opera tickets. This implies that VAT rates tend to have a positive relationship with the actual prices of these particular goods, which is in line with the theoretical prediction of an effect of a reduced VAT rate on price. A decrease in the VAT rate for books of one percentage point indicates that prices drop by 0.5 Euro; given the mean book price of 19.3 euros, the decrease of about 2.6% is also economically significant. There is no significant association found for the cinema category, which is possibly caused by the particularly profit-oriented activity of this category: any benefit from a tax decrease is not transformed over to the cinema consumer, but retained by the supplier.

Out of the socio-economic controls, population size and GDP per capita are found to be consistently positive and mostly turn out to be statistically significant. The education measure is estimated with less precision; it is significant and negative only for the case of book prices, implying that a less educated population coincides with higher book prices, all else equal.

3.6.3 VAT rates for books and expenditure

Next, we turn to the estimation of the effect of a fiscal reduction on a household's expenditure on books. Table 3.4 shows the associated cross-section results using data for the available year 2005 (for which book expenditure is known). The model estimates how book expenditure depends on the VAT rates for books, and all three fundamental determinants of cultural consumption are included (i.e., population, wealth and education). The correlation is found to be negative (column 1), indicating that for a one percentage point higher VAT rate for books, households spend 2.18 Euros less on books, on average.

Table 3.4 The casual impact of reduced rates on book expenditure

	(1)	(2)	(3)
	Expenditure books	VAT rate for books	Expenditure books
VARIABLES	OLS	First-stage OLS	IV
Standard VAT rate		0.467***	
		(0.145)	
VAT rate for books	-2.179*		-2.778**
	(1.262)		(1.303)

log(population)	-0.390	-4.218	-0.839
	(4.508)	(5.398)	(4.379)
GDP per capita	3.518***	0.00246	3.442***
	(0.568)	(0.0446)	(0.549)
Share of medium or high educational attainment (ages 15-64)	-0.716	0.127***	-0.644
	(0.485)	(0.0441)	(0.468)
Observations	25	409	25
R-squared	0.693	0.856	0.712
Number of years		21	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

However, this is only the correlation, and it gives us little information about the causal effect. The correlation estimate could be biased due to endogeneity. It could be the case that the effect is the opposite: countries with high cultural consumption decide to implement lower VAT rates. Alternatively, the point estimates could be biased due to omitted variables, such as, for example, unobservable country-specific preferences for culture. Therefore, we extend the OLS regression by an instrumental variable model in order to shed light on the causal effects.

We use the entire time series of the standard VAT rate as an instrument for VAT rates for books. The standard VAT rate is arguably exogeneous to the VAT rates for books, as it is decided upon by the policy makers without consideration of household expenditure on books. And yet, reduced VAT rates for books are related to the standard VAT rate, as they are typically set by each individual country in proportion to the regular VAT rate (EC, 2006). The first-stage estimation shows this to be the case (column 2). Instrumenting for the VAT rate for books delivers a negative and significant IV coefficient (column 3). This implies that a lower VAT rate on books has a causal impact on book expenditure. Considering the average household's expenditure on books of 102.3 euros per year, the coefficient implies that a one percentage point decrease in the reduced rate for books leads to an increase in expenditure by about 2.7%. This result is consistent with theory. Furthermore, by building on data for a wide set of EU Member States, we find strong support of the notion that cultural consumption can be triggered by the right fiscal discounts.

3.7 WIDER CULTURAL CONSUMPTION

So far, we have outlined the association between fiscal rates and book consumption, but the analysis can be also extended to a range of other cultural goods and services. Here we show how this could be done for the case of music and avail of a unique data recording the presence of classical music festivals, opera festivals, concert halls and opera houses. Any association between reduced fiscal rates and music festivals may reveal the power of fiscal policy to influence consumption of music. The later two measures, the presence of concert halls and opera houses are rather experimental and measure the presence of extraordinary cultural heritage. These buildings have been constructed mostly in past, hence if any patterns are found, they will shed light on the presence of long-term path dependencies between culture and fiscal systems or, perhaps, the unobserved socio-economic backgrounds of countries. An implicit advantage of the work undertaken within the RICHES project in this area is this attempt to map music-related heritage and music festivals in Europe.

3.7.1 The data on built music heritage and festivals

The mapping of Western music heritage has been conducted the subcontractor Lunida, Razvoj, inženiring in svetovanje d.o.o., based in Ljubljana, Slovenia. The database with key information on classical music was developed as part of the RICHES project and funded by the consortium's budget. The dataset is publically available. An excerpt from the geographic data is shown in Figure 3.7, while the complete geographic information is available online at http://mgm.civitat.com/. The interactive web map displays all gathered music data. Users can search the data by name and retrieve a detailed description for each concert hall, opera house or festival.[4]

The database design consisted in conceptual and physical design. The first part was the analysis of the available content, missing data, non-compatible data and afterwards the preparation of the procedures for data mining. The initial list of festivals and buildings was obtained from Wikipedia[5] and then it was carefully checked for each of the cases, using a range of online and offline information sources. It was also investigated as to whether any festivals or buildings are missing from the Wikipedia lists.

Where Wikipedia data was not sufficient, websites of individual opera houses, concert halls and festivals have been reviewed. We have also used the online database http://operabase.com/ to obtain information on capacity and have contacted via e-mail managers of the opera houses and concert halls to collect missing data on capacity. The response from managers was however low. An exhaustive list of used sources is available upon request.

The data has been further enriched with information on temporary closures, reconstructions, war and fire related destruction for the built heritage. This was conducted by extensive manual verification. The formal structure of place names has been disaggregated into city, province/state, and country structure. Place names have been GIS coded.

[4] The portal has been developed using open source software according to the requirements of other EC financed projects java scripts with Java Runtime Environment on the client side and PostgreSQL, PostGIS, GeoServer, OpenLayers, Apache Solr – Lucene on the server side.

[5] http://en.wikipedia.org/wiki/List_of_concert_halls , http://en.wikipedia.org/wiki/List_of_opera_houses, http://en.wikipedia.org/wiki/Category:Classical_music_festivals_by_country and http://en.wikipedia.org/wiki/List_of_opera_festivals

Figure 3.7 Mapping Heritage Western Music – An Overview

Source: http://mgm.civitat.com/mgm/

3.7.2 Music heritage and festivals and fiscal considerations

An interesting question deals with the association between fiscal policy and the presence of music-related heritage and music festivals. We have already seen in Figure 3.7 interesting clustering patterns and can cautiously deduct some qualitatively insights regarding fiscal support. It is even more difficult to estimate any quantitative patterns. One of the reasons for this is that historical fiscal or public support data is not known. Furthermore, we do not have data for any specific fiscal burden that is applied to the presence of built music heritage or music festivals. The physical construction of an opera house or concert hall is associated with a different type of tax, than the tax on the income generated by these institutions, or tax on entrance tickets or tax on purchases in the restaurant/café/shop that is often located in opera houses or concert halls. The same applies to music festivals: purchase of entrance tickets involves a different type of tax than consumption on site of a festival, and so on.

We provide in Table 3.5 an overview of the music heritage and festivals found in a country and the standard VAT rate. We use for this reason the standard VAT rate for the year 2014, which is the last one covered in our database. The motivation to look at VAT rates is given by the high positive correlation across all types of fiscal rates.

Table 3.5 Summary statistics: Music heritage and festivals

Country	Opera houses	Concert halls	Opera festivals	Classical festivals	Standard VAT rate
Austria	11	40	8	5	20
Belgium	4	11		1	21
Bulgaria	6	3		1	20
Croatia	5	2		1	25
Cyprus			1		19
Czech Republic	3	9		4	21
Denmark	2	13			25
Estonia		5			20
Finland	3	27	1		24
France	27	17	7	8	20
Germany	54	29	10	10	19
Greece	4	4			23
Hungary	6	10	3		27
Ireland	4	9	2	5	23
Italy	50	17	15	2	22
Latvia	1				21
Lithuania	1				21
Malta	3				18
Luxembourg		1			15
Netherlands	1	9		2	21
Poland	14	10		1	23
Portugal	2	8			23
Romania	8	29	1	4	24
Slovakia	3				20
Slovenia		1		1	22
Spain	13	18	1	1	21
Sweden	7	19	4		25
United Kingdom	18	65	12	25	20

One may be concerned about the reliability of this new database. Therefore, before estimating any correlations with the tax rate, we run a simple test and investigate what is the correlation across all covered music heritage buildings and festivals. Since all four measures concern the domain of classical music, a positive correlation is expected. Table 3.6 shows this to be the case: all correlation parameters are estimated to be positive and many of them are statistically significant at high confidence levels.

Table 3.6 Correlation between music heritage and festivals

	Opera houses	Concert halls	Opera festivals	Classical festivals
Opera houses	1			
Concert halls	0.4404*	1		
	(0.019)			
Opera festivals	0.8382*	0.6906*	1	
	(0.000)	(0.000)		
Classical festivals	0.3464	0.6539*	0.5448*	1
	(0.071)	(0.0002)	(0.0027)	

Covariance term in parentheses

Finally, we present in Table 3.6 the correlation coefficients between the standard VAT rate and the number of opera houses, concert halls, opera festivals or classical festivals in a country. Interestingly, the coefficient is always negative and sometimes rather large in size. Even though these coefficients are found outside the typical confidence intervals, the emerging insights support the view that a higher tax is associated with lower cultural wealth.

Table 3.7 Correlation between music heritage and festivals and standard VAT rate

	Opera houses	Concert halls	Opera festivals	Classical festivals
Standard VAT rate	-0.2714	-0.0893	-0.3943	-0.3563
	(0.1995)	(0.6853)	(0.2047)	(0.1924)

Covariance term in parentheses

3.8 CONCLUSIONS

Fiscal policy can be an important part of cultural policy, in particular the VAT rate discounts on cultural consumption, yet it receives less attention than deserved. This may be due to the lack of research to explain the impact of national measures on household consumption. In this section we shed some light on whether (and how) fiscal policy stimulates the consumption of Europe's cultural heritage.

An in-depth analysis of the historic characteristics in each country may provide a more holistic explanation of the findings, for instance, including country-specific cultural consumption preference for substitute cultural goods (e.g., books, opera and film), or country-specific policies to encourage production (e.g., various forms of support for film production). Further research is also needed to compare our results to the impact of VAT rates for other cultural goods, such as performing arts, heritage or the creative industries, as well as research on the increasingly digital consumption of cultural goods. Comparing the effect of a reduced VAT rate and that of a direct subsidy may highlight the strengths and weaknesses of each fiscal measure to achieve the desired goals.

Due to the positive externalities associated with cultural consumption, markets fail to provide the optimum quantity of culture at the right price. Tax instruments are thus proposed by welfare theory as effective tools that can be used to change the quantities and prices, in order to tackle market failures. From a policy perspective, this suggests that a reduction in VAT rates can stimulate household consumption, though with unequal benefit for the different socio-economic groups, and should consequently be designed in conjunction with a national cultural policy.

4. DIGITISATION OF HERITAGE COLLECTIONS AS INDICATOR OF INNOVATION

4.1 INTRODUCTION

It has been estimated that cultural and research content held in European memory institutions has a market value of €27 billion. This represents "the biggest single information content resource for the creation of value-added information content and services" (Jancic, 2015:4). It has also been estimated that 17% of heritage collections have been digitized (Stroeker and Vogels, 2014). Memory institutions have not been able to fully adopt the digital technology in order to become part of the information economy (Navarrete, 2014a). This innovation gap has received little attention while the social expectation of heritage content positioned within the information economy grows. Research has focused on the creative industries and their ability to innovate yet little is understood about the keepers of large information repositories made up of heritage collections.

Heritage organizations, particularly libraries, archives and museums, are the keepers of most cultural and research content. They are generally non-profit organizations driven by goals related to providing access to collections in order to facilitate knowledge creation (Bakhshi and Throsby, 2012) and hence fuel the creative economy.[6] Increasing and improving access to collections is an important driver for these organizations to adopt new technologies. Digitisation and publication of collections online can potentially allow access to content across the globe, and as such, liberate this untapped knowledge potential.

Since the 1990s, the European Commission has funded a number of projects to connect and give access to heritage materials in order to stimulate an innovative information society. Since the early 2000s, digitisation of heritage collections became part of the key strategies that would contribute to the knowledge economy enabled by "unrestricted, sustainable and reliable digital access to Europe's cultural and scientific knowledge" (OCW, 2004; Navarrete, 2014a:163). In 2007, a specific complementary Competitiveness and Innovation Program (CIP) was formed to fund the Information and Communication Policy Support Program, or ICT-PSP. Most recently, the Horizon 2020 framework (running from 2014 to 2020) aims at creating a genuine single market for knowledge, research and innovation. These efforts are meant to eradicate the digital divide, of the unequal distribution of and access to information to enable a more equitable social participation.[7] Content of memory institutions, including archives, libraries and museums, is essential in feeding a rich and diverse information infrastructure. All sectors benefit from the availability of creative content to innovate, as content creation and diffusion fuels adoption of new ideas across all sectors, expanding beyond the creative industries (Lee and Rodriguez-Pose, 2014). It could be argued that a content rich environment, fuelled by collections held in heritage organizations, support the formation of what Lee and Rodriguez-Pose (2014) refer to as *genuine breeding grounds*, key to creative cities and fundamental to drive innovation in all sectors.

To date, however, there is little known about the extent to which heritage organizations are able to innovate, or at least to adopt digital technology and increase access to collections. We argue that digitisation and the publication of heritage collections online can be considered as a first indication of the organization's ability to innovate in the

[6] The creative economy refers to "A complex system of resource management and exploitation which relies upon the exploitation of creativity and culture […] for generating sustained and inclusive economic growth, social development and environmental protection" (RICHES taxonomy, available at http://www.digitalmeetsculture.net/projects/riches/virtuality/#c).
[7] For a definition of digital divide, see the RICHES taxonomy (http://www.digitalmeetsculture.net/projects/riches/virtuality/#d).

creation of new heritage information services, expand audience reach or create new value for collections. We use data from the last ENUMERATE survey about the state of digital heritage in Europe, gathered in 2013 from about 1,400 institutions in over 30 countries. We analyse this dataset for the first time quantitatively by running a number of regressions and by considering all domains involved (archives, libraries and museums). A previous qualitative analysis using an older dataset and focused only on Dutch museums finds a slow growth of digital collections and their publication due to a national policy that focuses on innovation but misses to support organizational change or skill development (Navarrete, 2014b). We contribute to the understanding of innovation by correlating institutional performance, including the presence of a digitisation policy and skilled staff, with macro and meso indicators.

Using the level of digitisation of collections as indication of innovation, we identify the organizations that are further in the adoption of digital technology and the potential determinants that support (or hinder) such behaviour. The key question is what determines an organization's ability to innovate in order to meet the needs of the consumer in the information economy? In this way we hope to shed light on (digital) cultural consumption and to give policy recommendations that may assist facilitating an innovation environment for European heritage organizations. Furthermore, this research improves our understanding of heritage access across the European Member States and illuminates the extent of organizational innovation through the adoption of digital technologies.

Following the suggestion of Castañer and Campos (2002), we analyse the heritage institutions from a macro, meso and micro perspective. Among the most important positive determinants for innovation we find the level of digital literacy and level of education at national level (macro level), a historic familiarity with imaging (meso level) and the presence of a policy to guide digitisation (micro level).

The remaining of this part is organized as follows. Section 4.2 presents the concept of innovation in organizations and introduces the macro, meso and micro framework of analysis. In section 4.3 we present the data and in section 4.4 the results. A discussion on the findings takes place in section 4.5, to close with conclusions and policy implications in section 4.6.

4.2 INNOVATION IN ORGANISATIONS

According to Schumpeter (1947:153), organizations can "introduce technological novelties into the production of 'old' commodities" in order to improve their position in the market. Adoption of a new technology leads to innovation in the production process presenting first a *widening* pattern, in which many new firms enter the market with a similar use of technology, followed by a *deepening* pattern, in which a few large-budget institutions take a monopolistic role once technological change becomes predictable (Malerba and Orsenigo, 1995). Regarding the adoption of technological change, heritage institutions presented a widening innovation pattern in the 1990s when computers were adopted for collection management and again in the early 2000s when many organizations explored the use of the Internet. Navarrete (2014a) argues that heritage institutions have yet to fully adopt a digital work practice to enable them to innovate in the provision of heritage information services, to allow (re)use of content. Innovation in the provision of information services was found in government institutions that responded to external stakeholders, while response to internal stakeholders was linked to innovation in information management processes (Wang and Feeney, 2014).

Innovation as a result of adoption of technology by firms has been measured through inputs (e.g. R&D expenditure) and outputs (e.g. patents and innovative output) (Acs and Audretsch, 2005). Castañer and Campos (2002) argue that innovation output within cultural organisations can be observed in the creation of new content as well as in the form in which content is presented. More specifically, Bakhshi and Throsby (2012) identify innovation in audience reach, in art form development, in value creation and in business management and governance.

Innovation in form, or the provision of new heritage information services (the way in which consumers are able to interact with the content), can be observed in libraries, archives and museum institutions. Innovation takes place in the presentation of content, as collections are published online on the institutional website, various portals or other social media platforms (i.e. Flickr, Facebook, Wikipedia).[8] This leads to innovation in audience reach, as institutions seek to position their collections *where the users are*, including the development of services online and onsite (e.g. interpretation materials using smart phones). Damanpour (1987) stresses the key role of consumers as endogenous factors in such service innovation by heritage organizations because, he argues, success is "contingent upon the joint efforts of the organization and its clients" (p.677). Innovation also takes place in the creation of new content, as new images are created (e.g. megapixel, 3D visualizations) and objects are placed within new contexts (e.g. thematic online exhibitions). This in turn leads to innovation in value creation, as heritage institutions reposition themselves in the online market of information and explore new business models to finance their activities (innovation in business management).

We consider digitisation of collections and online publication, an indicator of the innovation potential in heritage institutions. That is, organizations that are able to adopt digital technology to change work practice internally, reflected by the level of digitized collections, will be able to innovate in the provision of heritage information services, starting with online publication of their content.[9]

4.2.1 Macro analysis

According to Castañer and Campos (2002), the ability of a heritage organization to innovate can be analysed from a macro, meso or micro perspective. A macro approach considers the national context, including the availability of a national policy, regulations or general socio-economic conditions. Wealth (measured as GDP), population size and level of human capital (measured in the level of educational attainment) have been found to be determinants for innovation (Heilbrun, 2001; Pierce, 2000). Castañer and Campos (2002) question the level of education of consumers as a stimulus for innovation by heritage organizations, and concert halls specifically, because, they argue, the general public has little influence on the programming, albeit their argument is not backed up quantitatively. Dimaggio and Stenberg (1985) find the role of patrons, instead of the general consumer, to influence innovation.

The role of consumers as trigger for innovation may increase in an online information market as producers respond to growing information literacy and increased online consumption. European archives, libraries and museums are increasingly joining alternative online publication spaces to reach the public (Stroeker and Vogels, 2014) - possibly in response to an increase in digital literacy of societies. In 2014, for instance, 64% of the population in Europe had access to the Internet via mobile broadband and 75% of the population used the Internet (ITU, 2014).

[8] Refer to Navarrete and Borowiecki (2015) for an investigation of how online publication of heritage content transforms patterns of traditional consumption.
[9] RICHES D4.1 examines several European cultural heritage portals and shows results and views from user testing.

Geographic concentrations of innovation have been linked to the spill over found when knowledge is created and shared. That is, higher concentration of innovative activity is found in specific geographic locations where also the concentration of the stock of knowledge is greater (Acs and Audretsch, 2005; Borowiecki, 2013).

4.2.2 Meso analysis

Analysis of innovation can also consider a meso perspective. Dopfer (2012) argues for a mesoeconomic approach to capture the transitional change between the innovative idea of an entrepreneur (micro level) and its diffusion and implementation at the macro level. Following Schumpeter (1942) and his proposition that innovation is driven by an entrepreneur with a following of individuals; Dopfer proposes meso as a structure component and as a process component for analysis. A meso approach, he argues, can be used to refer to instances found within specific industries, sectors or technologies. Baumol (1968) discusses the role of the entrepreneur and further lays the ground for the development of a sector analysis, namely of the economics of culture with focus on the performing arts, as specific sector within the economy.

Castañer and Campos (2002) focus on the performing arts sector and identify source of funding as comparative determinant among organizations within the sector for the meso analysis.[10] We chose, instead, to consider funding source as part of the micro level analysis, since our data allows us to disentangle funding sources at the institution level. The meso perspective is reflected by the three distinct domains: archives, libraries and museums. This is motivated by the fundamental differences across these domains, including characteristics in collection type, share of digitisation and position in the market. All domains innovate in the way collections can be consumed, widening audiences, and creating additional value, though each domain has specialized in their approach to present content and to engage consumers. Appendix 3.A provides an overview of some of these differences and outlines some recent trends for archives, libraries and museums.

4.2.3 Micro analysis

A micro level of analysis on the ability to innovate considers size, age, and administrative and power structures of the organization (Castañer and Campos, 2002). Innovation and size of institution have been associated positively, where organisations with little restraint of resources have a greater ability to innovate (Castañer, 2014; Damanpour, 1987), particularly when holding a monopolistic position (Schumpeter, 1947). Innovation require a high fixed cost and it is a risky investment; therefore the success of innovation depend on economies of scale and scope for R&D, and benefits are related to the organization's market power (Acs and Audretsch, 2005). Firms with organizational slack can absorb failure, can bear cost of adopting innovations, and can "explore new ideas in advance of an actual need" (Rosner, 1968:615). In certain industries, including those related to information technology and services, small enterprises have a greater ability to innovate because of their flexible, non-bureaucratic management structures, which place innovation at the core (Acs and Audretsch, 2005).

[10] On the issue of funding heritage institutions, and cultural consumption more in general, refer to Borowiecki and Navarrete (2015).

Technical complexity of an organization, reflected by specialized staff, has been found as positive determinant for technical innovation (Damanpour, 1987). However, organizations may also allocate resources to outsource specialized knowledge.

Empirical research on heritage organizations structures has identified the presence of multiple key goals, which can conflict when resources are limited or priorities are not clear. Theatres, for instance, may have a management with a managerial or an artistic background, the former being less inclined to innovate than the later (DiMaggio and Stenberg, 1985). Archives, libraries and museums also present multiple organizational goals related to giving access, preserving the collection and developing further value through research (Brokerhof, 2006).

4.3 DATA

The European Commission ICT Policy Support Program funded ENUMERATE, a project to gather and analyse data on the state of digital heritage across Europe.[11] We use results from the second survey that covers 2013 (ENUMERATE Core Survey II full dataset) including responses from 1,370 institutions from 35 countries. Digitisation refers to collection objects that have been documented in a digital database and include a digital image. This dataset is the core of the micro and meso level analyses. Data on socio-demographic patterns in European countries – the core of our macro level variables, originate from the Eurostat statistics for 2013, the same year as the ENUMERATE dataset. We use GDP per capita, population size, and educational attainment (mid to high level of education for 15 to 64 years old) as macro indicators. We further use the Individual Use of Internet in 2013 variable for the macro analysis, obtained from ITU (2014). Table 1 shows a summary. A total of 1,148 institutions report the share of digitisation, which is equal on average to 17.3%. The available meso indicators are restricted to the domain of an institution.[12]

Table 4.1 Summary of micro and meso indicators (%)

Variable	Obs	Mean	Std. Dev.
A. Micro-level			
share digitized	1148	17.29	23.55
digitisation strategy	1179	0.38	0.49
digital preservation strategy	833	0.28	0.45
policy use	838	0.36	0.48
publication online	748	42.73	39.82
budget	1369	3.99	1.84
budget squared	1369	19.31	14.28
FTE	1369	67.10	265.29
FTE specialized	764	0.33	1.36
Funding source:			

Variable	Obs	Mean	Std. Dev.
B. Meso-level			
archive	1369	0.24	0.43
museum	1369	0.40	0.49
other	1369	0.04	0.20
library	1369	0.32	0.47
C. Macro-level			
GDP per capita	1364	29161.1	12132.5
population (logged)	1365	16.59	1.43
educational attainment	1364	72.50	11.72
Internet access	1369	79.49	11.53

[11] ENUMERATE: A European Survey for Statistical Intelligence on Digitization, Digital Preservation and Online Access to Cultural Heritage was funded under the CIP-ICT-PSP Program of Statistics on Culture, with a budget of €321,000 and coordinated in the UK. In 2014, ENUMERATE became part of Europeana (www.enumerate.eu).

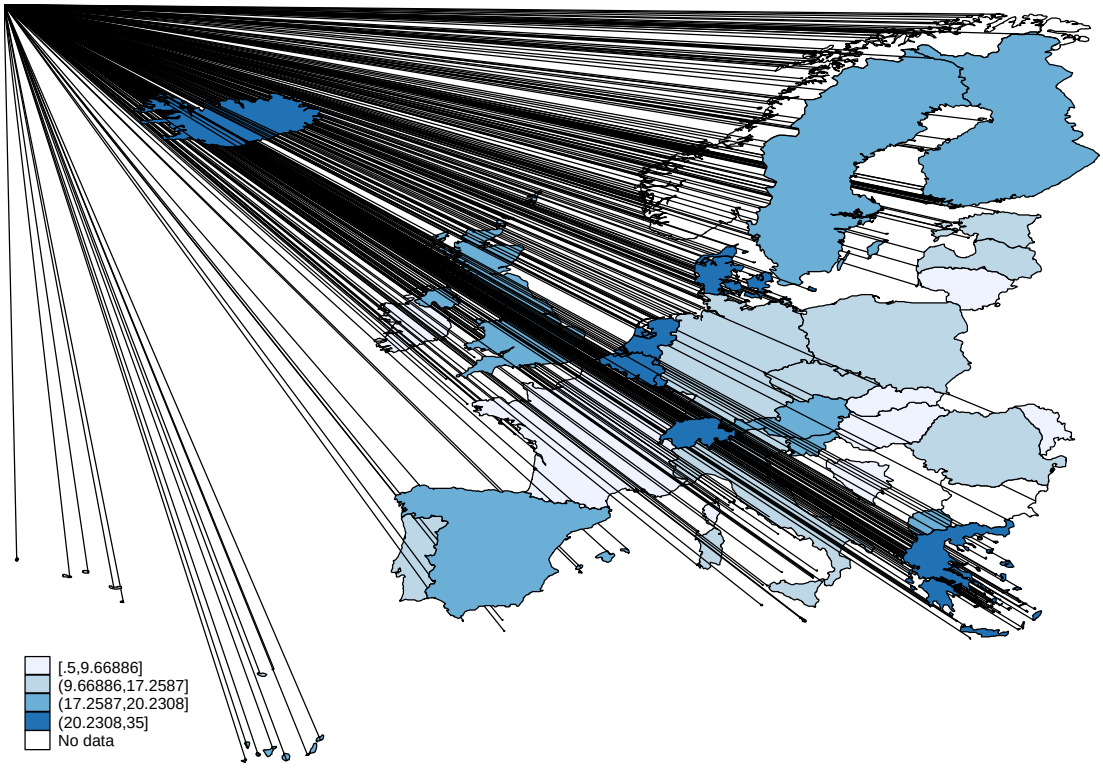
[12] Ideally, one would measure the meso dimension with the demand for a given institution or sector. For example, the number of users per country may play as indication of the 'need' of a certain sector offline. This type of information is however not consistently available for the large number of types of institutions and countries covered here. The European Bureau of Library, Information and Documentation Associations (EBLIDA) publishes yearly data on libraries while the European Group on Museum Statistics (EGMUS) publishes data on museums. Unfortunately, no comparable dataset is available from the archive. Therefore, we restrict our approach to controls for the sector and extend it in some cases to the specific type of institution.

internal budgets	793	0.88	0.32	Regions:			
crowdfunding	793	0.02	0.14	Nordic	1369	0.17	0.38
national grant/subsidy	793	0.40	0.49	West	1369	0.14	0.35
regional grant/subsidy	793	0.22	0.42	British Isles	1369	0.05	0.22
private funds	793	0.12	0.32	South	1369	0.20	0.40
public private partnership	793	0.09	0.29	East	1369	0.15	0.35
sales of digital items	793	0.10	0.30	South-east	1369	0.04	0.20
Other	793	0.07	0.26				

Data source: ENUMERATE for the year 2013.

Some of the geographic differences with regard to digitisation intensity found across European countries are visualized in Figure 4.1 (the darker the country, the higher the digitisation of collections share). Malta reported the highest share of digitisation, followed by Cyprus, Luxembourg, Macedonia, Greece, Austria, Spain, the Netherlands and the UK. France reported the lowest share of digitisation.[13]

FIGURE 4.1 Share of digitzation of collections per country



Multiple regression analysis was used to determine the relationships between share of digitisation as dependent variable against several independent variables organized into macro, meso and micro groups. The data Appendix 3.B provides a detailed list and description of the variables used.

[13] It is important to note that the response rate per country varied. Response per country: Austria 36, Belgium 29, Bosnia and Herzegovina 1, Bulgaria 1, Cyprus 13, Czech Republic 34, Denmark 16, Estonia 16, Finland 59, France 2, Germany 279, Greece 10, Hungary 44, Iceland 38, Ireland 15, Italy 25, Latvia 4, Liechtenstein 1, Lithuania 61, Luxembourg 15, Malta 2, Monaco 1, Netherlands 143, Poland 23, Portugal 44, Republic of Macedonia 1, Republic of Moldova 1, Romania 1, Slovak Republic 4, Slovenia 57, Spain 180, Sweden 125, Switzerland 23, United Kingdom 55. By including later country fixed effects in some regressions, we account econometrically for the international differences in the response rates.

4.4 RESULTS

In this section we present the regression results. We developed models around three distinct themes: level of digitisation, digitisation policy and use of collections. The themes emerged from the preliminary analysis as key differentiation factors for the share of digitisation and hence for the ability of European heritage institutions to innovate.

4.4.1 Level of digitisation

For the first model (see Table 4.2), we regress the share of digitisation as a function of sets of potential correlates. Column 1 presents a simple estimation, where the independent variables include digitisation strategy, institutional budget (second order polynomial to allow for non-linear effects), total full-time employees (FTE), sector indicators and region controls (not reported). We extend the model by the share of specialized FTE in column 2, funding sources in column 3 and macro indicators in column 4. Column 5 provides the strongest and preferred specification where country and type of institution controls are included instead of the region controls or macro-level variables.

Table 4.2 Level of digitisation

	(1) Digitized	(2) Digitized	(3) Digitized	(4) Digitized	(5) Digitized
VARIABLES	Baseline	Baseline plus FTE specialized	Baseline plus fund sources	Baseline plus fund sources plus macro	By country and type
Digitisation strategy	6.941***	6.275***	6.433***	6.673***	6.798***
	(1.595)	(1.771)	(1.827)	(1.839)	(2.073)
Budget	5.205**	4.674**	4.402**	4.699**	4.667*
	(1.928)	(2.156)	(2.102)	(2.160)	(2.392)
Budget^2	-0.670***	-0.628**	-0.577**	-0.627**	-0.653**
	(0.238)	(0.264)	(0.257)	(0.264)	(0.298)
FTE	-0.000919	-0.00404***	-0.00416***	-0.00390***	-0.00337**
	(0.00252)	(0.000822)	(0.000846)	(0.000865)	(0.00131)
FTE specialized		1.201	1.277	1.210	1.312
		(0.884)	(0.907)	(0.928)	(0.858)
Archives	-2.260	-2.260	-2.224	-2.139	
	(2.441)	(2.441)	(2.224)	(2.229)	
Museums	11.54***	11.54***	11.45***	11.45***	
	(2.754)	(2.754)	(2.680)	(2.755)	
Other	13.15***	13.15***	13.49***	12.65***	
	(3.607)	(3.607)	(3.529)	(3.646)	
GDP per capita				-3.61e-05	
				(7.72e-05)	
Population, logged				-1.689**	

				(0.661)	
Education level				0.259**	
				(0.120)	
Internet access				-0.0238	
				(0.145)	
Region controls	yes	yes	yes	yes	
Funding controls			yes	yes	
Type of institution controls					yes
Country controls					yes
Observations	721	721	721	717	721
R-squared	0.149	0.149	0.152	0.157	0.209

Note: Robust standard errors in parentheses. Some of the specifications include region controls (dummy variables for different parts of Europe), funding controls (dummy variables for source of funding of the institution), type of institution controls and country controls. See Data Appendix 4.B for further details on the included control variables. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 percent confidence.

Throughout all specifications the most robust association is found with the digitisation strategy variable. Heritage institutions that have a policy strategy for digital activities have digitized between 6.3 and 6.9 percent of their collections more. Alternatively, since we look here at correlation-coefficients only, it could be the case that institutions that digitise more, have the incentive to define a digitisation strategy; this direction of the effect is however less likely and cannot be repeated (i.e. once the digitisation strategy is defined, introducing another strategy is not possible).

Similar strong correlations are found with the budget variables: wealthier institutions digitize more, however at a decreasing rate. The size of the workforce is negatively related with digitisation share if one accounts for the share of specialized employees. The association with FTE is however rather small. These two coefficients compared indicate that size of institution is possibly less important than the slack available to innovate.

The correlation coefficient for the share of specialized workers is positive and quite large, albeit outside the usual confidence intervals. There is no statistically significant difference between archives and libraries, while museums digitize about 11.5 percent more.[14] The set of variables on the funding source do not deliver any significant correlations (not reported), implying that funding source may have a minimal impact on the digitisation intensity.

Institutions in countries with greater population are found to digitize less. The correlation is however positive for the share of population with mid- or high-educational attainment. This may suggest that countries with a higher level of education are more capable of adopting the digital technology and hence innovate. Wealth of a country and average personal access to the Internet do not exhibit any significant relation to the share of heritage digitisation.

[14] The set of controls for type of institution indicate that art museums have by far the highest share of digitization while national libraries are on the other side of the spectrum. These coefficients are presented in detail in Table C.1 in Appendix C.

Countries were grouped in regions for the first model. West and South Europe are the regions with the highest share of the collections digitized, followed by the South East region, the British Isles, and the Nordic countries. The East region reported the lowest share of digitisation.

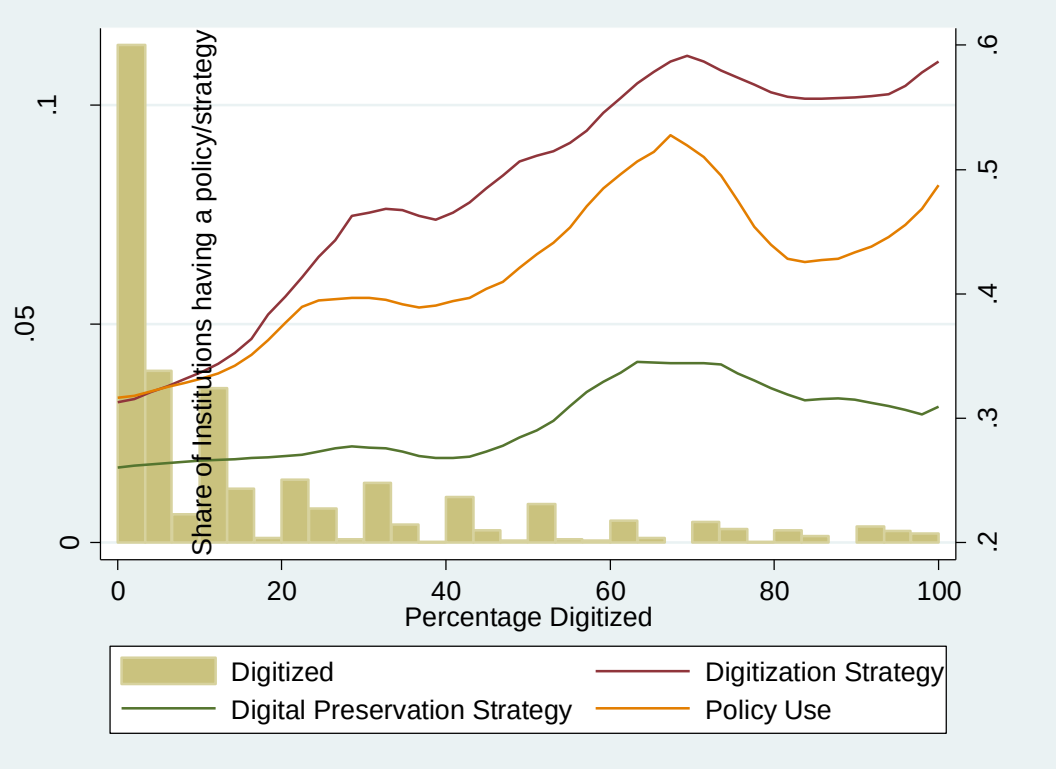
Finally, we perform a range of robustness check, including tests where we control for countries participating as partners in the ENUMERATE consortium (i.e., Austria, Belgium, France, Germany, Hungary, the Netherlands, Slovenia, Spain, and the UK). One could worry that the ENUMERATE partners are particularly well connected to cultural institutions in their countries that exhibit unusually high digitisation rates. The results shown in Appendix 3.C (Table C.2) indicate that this is not the case.

4.4.2 Digitisation policy and costs

The previously disclosed remarkably strong association with the presence of a digitisation strategy is interesting and raises the question on the role of internal policies in general. In a second set of models, we shed light on the correlates of three different policy types, the cost of digitisation and success of online publication. The institutions surveyed reported on whether they have implemented a general digitisation strategy, a policy of use of digital collections, and a digitisation preservation strategy to ensure long-term access to the digital heritage materials.[15] Figure 4.2 shows a histogram of digitisation success (left vertical axis) and gives an overview of the relationship between digitisation of collections and the implementation of various policies (right vertical axis). The histogram suggests a right-skewed distribution: about 12% of institutions have not digitized anything, around 4% of institutions have digitized ca. 15% of their collections and the share of digitisation decreases across the density graph. The presence of any of the three policies has the opposite relationship with digitisation practise. Approximately, three out of ten institutions that have digitized very little (or nothing) have one of these policies. The presence of a policy is more likely in institutions that digitize a lot, reaching around 60% of institutions. It is interesting to observe that a significant share of institutions that do not digitise (much) have a digitisation policy, while there exist also a meaningful share of institutions that digitise heavily that do not have any policy. This may suggest that having a digitisation policy is not a necessity for digitisation success; however it may be highly beneficial. Furthermore, interesting differences across the three policies are detected: The least volatile of the three is found to be the digitisation preservation strategy; much steeper are the policy use and digitisation strategy indicators and the suggested association with share of digitisation is much more explicit. These results suggest that policy is a reasonably strong correlate of digitisation, and may be seen as indication of a mature digital work practice, hence an indicator of higher ability to innovate.

[15] Institutions were asked whether they had a written policy endorsed by the management of the organization that a) set a strategy for digitization; b) set conditions for specific types of use of the digital heritage collections; and c) set a strategy for the digital preservation and permanent access to the digital collections. These three documents form the Information Plan which roughly establish how will ICT support the organizational mission and goals, how will digitization be realized (i.e. selection and prioritization, production format), what services will be provided (i.e. access policy, licensing, crowdsourcing), and how will these services be ensured in the long-term (sustainability).

FIGURE 4.2 Digitisation policy by share of digitisation



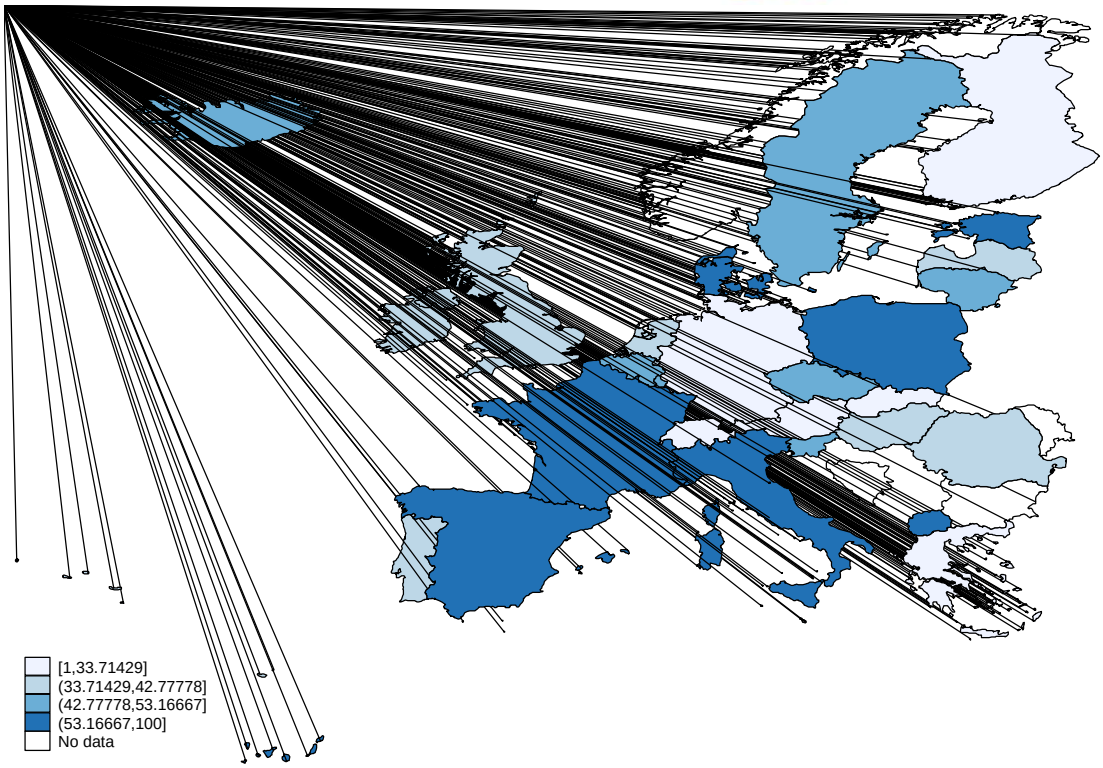
The association between the policy variables is exploited further in more robust models that include many of the previously introduced control variables. The results are shown in column 1 of Table 4.3. As disclosed in Figure 4.2, the association between digitisation strategy and digital preservation strategy or policy use are positive and significant. Positive coefficients are found also for the share of digitisation or the share of employees specialized on digitisation. We further explore the cost dimension related to digitisation of new content. Institutions reported on the percentage of incidental costs that are related to the initial creation or acquisition of a digital collection, as opposed to structural costs used for ongoing maintenance of the digital collection. In column 2 of Table 3 we conduct the analysis by regressing incidental cost on our set of control variables. We find strong negative coefficients for both the policy on use of digital materials and on the preservation strategy. This suggests that institutions with a clear strategy or policy use are more advanced in their adoption of a digital work practice. This result is reinforced by the negative coefficient found on the specialized FTE. Employment of specialized employees is shown to decrease the cost of digitisation. Museums in general report the lowest share of incidental costs followed by archives (full set of coefficients reported in Table C.3 in Appendix 4.C). This may be a reflection of the large incidental funds available to libraries to digitize their collections (e.g. through Google), reported at 34% higher than museums and 30% higher than archives.

Table 4.3 Digitisation policy and digitisation of collections

VARIABLES	(1) Digitisation strategy	(2) Incidental cost	(3) Online publication
Digitisation strategy		1.368	4.029
		(2.340)	(3.324)
Digital preservation strategy	0.367***	-6.879**	
	(0.0559)	(2.684)	
Policy use	0.290***	-6.572**	
	(0.0517)	(2.680)	
Collections digitized	0.00161**	-0.0494	0.305***
	(0.000607)	(0.0564)	(0.0622)
Internet access	0.00450	0.102	0.541**
	(0.00267)	(0.185)	(0.248)
Budget	0.00450	1.641	-3.350
	(0.0359)	(3.513)	(3.284)
$Budget^2$	0.00290	-0.317	0.613
	(0.00444)	(0.394)	(0.387)
FTE	3.32e-05	-0.000867	0.00522
	(5.56e-05)	(0.00219)	(0.00466)
FTE specialized	0.0190*	-2.012**	-0.205
	(0.00939)	(0.759)	(0.522)
Macro-level controls	yes	yes	Yes
Domain controls	yes	yes	Yes
Funding controls	yes	yes	Yes
Region controls	yes	yes	Yes
Observations	668	668	630
R-squared	0.395	0.087	0.277

Note: See Table 2. The macro-level controls include here GDP per capita, population (logged) and educational attainment.

FIGURE 4.3 Publication of collections online per country



Finally, we turn to an analysis of the online publication activity. The variable provided by ENUMERATE is expressed as the share of online disseminated material (e.g. publication through own website, portal, an aggregator, Wikipedia, social media or other channels). A descriptive overview of the online publication rates in Europe is presented in Figure 4.3, while column 3 in Table 4.3 reports the correlates for online publication. The significant (and positive) associations disclosed are with the share of digitisation and, perhaps more interestingly, with personal Internet use in a country. Societies that exhibit higher Internet access rates per capita can possibly also better use the online resources published by heritage institutions – this may create a strong incentive for the institutions to publish online.[16]

4.4.3 Use of collections

Next, we move our focus to the user of digital material and develop a model where we explore the relationship between digitisation and type of user of the digital collections. The used data provides information on the institutional level of importance of a certain type of users – the implemented scale is between one (the least important) and ten (the most important). The categories of users are grouped by ENUMERATE into academic research, creative reuse, educational use, commemorative use, personal enjoyment, preservation, commercial use and other type of use. Table 4.4 summarises the findings (full set of coefficients is reported in Table C.4 in Appendix 3.C).

[16] Museums reported the lowest share of online publication of digital materials followed by archives. Regional differences were found where South Europe reported the highest publication of collections, followed by East, South East and West Europe. Central Europe seems to lay behind publication of collections online. See Table C.3 in Appendix C for details.

Table 4.4 Users of digital heritage collections

VARIABLES	(1) Academic research	(2) Creative reuse	(3) Educational use	(4) Comme-morative	(5) Personal enjoyment	(6) Preservation	(7) Commercial	(8) Other Use
Digitisation strategy	0.453***	0.552*	0.200	0.252	0.228	0.245	0.0156	0.773***
	(0.126)	(0.281)	(0.179)	(0.412)	(0.199)	(0.189)	(0.176)	(0.277)
Budget	-0.221	-0.296	0.237	0.0842	-0.0912	-0.0641	0.300	0.363
	(0.162)	(0.234)	(0.261)	(0.309)	(0.372)	(0.300)	(0.243)	(0.336)
$Budget^2$	0.0393*	0.0427	-0.0162	-0.0180	0.0117	0.0158	-0.0214	-0.0372
	(0.0213)	(0.0298)	(0.0313)	(0.0356)	(0.0444)	(0.0392)	(0.0295)	(0.0425)
FTE	0.000167**	-0.000349	0.000494***	-0.000239	-0.000247	-5.18e-05	-0.000157	6.38e-06
	(6.97e-05)	(0.000219)	(0.000104)	(0.000221)	(0.000343)	(0.000258)	(0.000161)	(0.000227)
FTE specialized	-0.0834	-0.00499	-0.0572	-0.101**	-0.0660	-0.0390	-0.00919	0.218***
	(0.0846)	(0.0705)	(0.0968)	(0.0451)	(0.114)	(0.0412)	(0.0960)	(0.0615)
GDP	-5.63e-06	-3.51e-05***	1.95e-05***	-1.53e-05	-1.17e-05	-3.01e-05**	-3.21e-05***	-3.61e-05**
	(1.02e-05)	(1.12e-05)	(6.72e-06)	(1.28e-05)	(1.87e-05)	(1.23e-05)	(1.13e-05)	(1.56e-05)
Population size	-0.119**	-0.249**	-0.174***	-0.197*	0.0241	-0.139	-0.00708	-0.0413
	(0.0578)	(0.0920)	(0.0478)	(0.103)	(0.122)	(0.0903)	(0.0712)	(0.130)
Education level	-0.0293***	0.000196	-0.00677	0.0461**	-0.00952	-0.0215	-0.0297	0.0138
	(0.00948)	(0.0195)	(0.00656)	(0.0211)	(0.0337)	(0.0177)	(0.0179)	(0.0324)
Internet access	-0.0297**	-0.0105	-0.00813	-0.0104	0.0375	-0.0195	0.0296	0.0397
	(0.0136)	(0.0286)	(0.0126)	(0.0233)	(0.0330)	(0.0173)	(0.0180)	(0.0277)
Type of institution controls	yes	yes	Yes	yes	yes	yes	Yes	yes
Funding controls	yes	yes	Yes	yes	yes	yes	Yes	yes
Region controls	yes	yes	Yes	yes	yes	yes	Yes	yes
Observations	725	725	725	725	725	725	725	725
R-squared	0.148	0.116	0.188	0.146	0.150	0.116	0.213	0.089

Note: See Table 2.

Analysis of the type of use shows that the academic researcher has a significant positive relationship to the presence of a digitisation strategy, as well as to higher education libraries and large organizations publishing collections. A negative coefficient is found in relation to Internet access. This may suggests that academic use of digital collections is directly linked to large universities who serve, also, as providers of Internet. Academic use is of lower importance for audio-visual archives, film institutes, ethnographic museums and public libraries, again possibly supporting the link to digitisation projects in large universities. Also countries with a larger population report a lower academic use. Surprisingly, there is a negative coefficient found on the level of education share and academic use of collections. One possibility is that the overall educational attainment found in a country does not necessary reflect the societies' involvement in academic activity; however, this may be pointing to additional unobserved variables.

Regarding the macro indicators, GDP per capita result in a significant negative coefficient for creative, preservation and commercial use of heritage collections, while the coefficient is significantly positive for educational use. This may suggest that wealthy countries support the educational mandate of heritage institutions but have yet to discover potential alternative uses, perhaps due to unobservable causes (e.g. licensing and copyright issues). A general negative relationship is found between the population size and use of heritage collections. This complements the result from model 1 where higher populated countries are found to exhibit a lower digitisation share, which may suggest a general lower digital activity.

Regarding the type of materials used by the various user groups we find that archives are strongly associated with commemorative and preservation use, while there is a negative relationship to personal enjoyment and commercial use. Libraries value higher academic research, preservation and commemorative use, but not commercial or personal enjoyment use. Museum collections are also linked to preservation and commemorative use, though natural and science collections have a negative coefficient on commemorative use. It is not surprising that historic use is associated to art, history and ethnographic museum collections only. There is also a negative relationship to commercial use, which may indicate that efforts to privatize museums (or perhaps to operate them efficiently), are not particularly successful in Europe. Audiovisual and film collections are associated with commercial use but not with academic use. Performing arts collections are associated with academic research and educational use but also with preservation use.

Linking funding source and type of use reveals certain patterns of digitisation related projects. Internal funds are highly associated with preservation use, while national and regional public funds are associated to academic research, creative use, commemorative use, personal enjoyment and commercial use. Private and public partnerships are associated with personal enjoyment and result in a significant negative coefficient for commercial use. This is surprising as private funds are positively associated to commercial use, as are funds raised through sale of digital products.

4.5 DISCUSSION

4.5.1 Discussion macro perspective

From our results on the three models we can conclude that macro determinants are related to the innovation ability of heritage institutions. The most important positive determinants to foster innovation are level of education of a country (model 1) and personal access to the Internet (model 2). The later takes place, however, indirectly: a greater digital literacy in a country has a strong positive relation to the share of collections published online. This would suggest that the innovation potential of heritage institutions currently depends more on the national educational development and culture to adopt the digital and less on the wealth of a country. After all, digitisation technology is available and is not necessary very costly; what is possibly of greater importance is the willingness (and possibly ability) of a society to implement and use digital heritage material. Countries with a higher GDP report a higher allocation of incidental costs towards digital activities, which may indicate a transition to the digital work practice. This tends to result in a lower presence of a policy (results from our model 2 on digitisation policy) and therefore we expect a lower total digitisation output.

From our model 1 on level of digitisation, however, there is no significant relationship between GDP and level of digitisation. This may suggest that wealthier countries are starting to support the switch to a digital work practice in heritage institutions, though results are not yet visible, since contents have been identified as highly valuable. This supports the claim that heritage institutions have yet to become digital (Navarrete, 2014a).

A positive, significant relationship was found between countries with a higher GDP per capita and educational use of heritage collections, while a negative relationship was found for preservation, creative and commercial use. This could suggest that wealthier countries favour an arm's length policy towards digitisation of heritage institutions, which has thus far hindered innovation (reflected in a lower digitisation share and lower online publication) as institutions lack structural funds, a digital strategy and attention for preservation. This is not to suggest that public funding encourages innovation but it does point to the need for structural funds to build a digital information infrastructure to serve as springboard from which heritage institutions can innovate.

Having funds available towards digital activities is thus not enough to innovate: resources must be properly allocated towards sustainable solutions, as further suggested from our model 3. We find that digitisation of collections funded by national and private governments are not used for preservation but are used for creative and commercial use, suggesting a funding priority for projects that foster further independence from government funds to satisfy an immediate market. Private-public initiatives, on the other hand, appear to strongly disfavour commercial use of digitized collections but do support personal enjoyment suggesting a preference for a heritage rich information environment. Favouring creative reuse and personal enjoyment use of collections indicates an environment conductive of creative industries, prevalent in Nordic Europe and the British Isles.

Countries with a larger population appear less able to support digital literacy and innovation. That is, not only is the share of digitized collections smaller but there is also a lower use of the available materials. Innovation is also somewhat affected by education level. Countries with a higher level of education report a significantly higher share of digitisation (model 1) and at the same time a significant but slightly lower presence of a digitisation strategy (model 2).

Finally, countries with a higher personal use of the Internet appear more conducive to innovation as the share of the digitized collections published online is found to be significantly higher. It can be expected that as the level of Internet literacy becomes increasingly part of the general level of education, the combined new human capital indicator will influence innovation. Further, as online markets blur boundaries between producer and consumer, it can be expected that heritage institutions will increasingly benefit from an environment with a higher human capital (measured by level of educational attainment and Internet literacy) and this may translate into a particularly rich contextualization of heritage collections online.

4.5.2 Discussion meso perspective

Our results from the three models indicate that the three heritage sector domains (archives, libraries and museums) have distinct approaches towards adopting a digital work practice and hence innovation. This may be due to the fundamental difference in the type of collections and organizational goals, but may also relate to the different historical developmental paths of the domains.

Archives reported the lowest share of digitisation and of publication of their holdings. This result may be explained by the complex institutional nature, which is identified as the gap between e-government policies and practice (Barata, 2004), as well as by an increased availability of genealogy Internet sites that provide alternative data rich information services (Yakel, 2004). Archives, in contrast to libraries and museums, do not have a history of guiding policy based on benchmarked use of collections, but are based instead on providing access and therefore do not account for share of collection used. This may change with the growing awareness of personalized access to information rights and through international coordinated efforts to gather data. Collections from the national archives are strongly related to preservation and commemorative use, presumably linked to official and government-related activities. Though archival collections have started to innovate in content publication platforms such as social media (e.g. Flickr), statistics reflect that there is still a limited market share.

Libraries report by far the largest share of online publication of collections, from what they have digitized (available as surrogate), and yet this constitutes a relatively small share of their vast collections. The share digitized is expected nonetheless to increase, given the involvement of libraries in mass digitisation projects, which focus on the scanning of books, with online publication as part of the digitisation process. Library collections are strongly associated with preservation use, suggesting that the general use of collections involves older material in the public domain.

Museums, particularly of art and history, have a long tradition of working with images. It is therefore not surprising that art museums rank the highest in digitisation share. This is because digitisation is defined as a digital record of an object with an image. Libraries, though they may have a more comprehensive digital catalogue of their holdings, rarely have all their objects digitized (available as digital surrogate).

One important finding is that, even though art museums report the highest share of digitisation and presence of a digitisation strategy, they inversely reported the lowest share of online publication. This indicates the presence of unobserved variables that inhibit dissemination on the Internet. One inhibiting factor may be related to issues of copyright, cost related to license clearance or a lack of understanding of the online legal framework.

Another challenge, encountered in some countries, may relate to the fear of museums losing income from visitor entrance fees. However, the fear of cannibalisation after publishing collections online is being increasingly challenged empirically. For example, Bakhshi and Throsby (2014) show that digital publication (live broadcasting of theatre to digital cinema) does not substitute for traditional performance.

4.5.3 Discussion micro perspective

The key determinants for innovation at micro level were found to be slack, specialized staff and the presence of a digitisation policy.

Organizations with a large budget were found to have a greater share of digitisation yet not when they have a particularly large staff. This supports the expectation that larger institutions may be inflexible or too bureaucratic to allow innovation (Acs and Audretsch, 1990). Our result is in line with previous findings that differentiate general size of an institution and its unused resources that can be positioned towards other activities, to influence innovation. Having specialised staff was found to directly influence the share of digitisation, supporting previous findings that identified technical complexity of an organization as a positive determinant for innovation (Damanpour, 1987). Specialized staff

had further a negative relationship to incidental costs reflecting maturity in their adoption of a digital work practice and ability to innovate.

Unlike expected, adoption of digital technology in heritage institutions across Europe is still in the *widening* pattern, as described by Malerba and Orsenigo (1996). That is, we do not observe large institutions having a higher portion of their collections digitized, which would indicate a *deepening* pattern with concentration of innovative activities. Instead, we observe there are many organizations still adopting the technology and gradually changing their work practice. This is in line with Stroeker and Vogels (2014) who report 53% of institutions being involved with costs related to the adoption of a digital work practice.

Organizations with a digitisation strategy were found to have a larger share of their collections digitized. It can be argued that technical complexity is reflected in an organization's ability to develop multiple specialized digital policies. We could then argue that organizations that have a long-term strategy for digital collection use, or a preservation policy, have a higher understanding of the digital work practice and hence higher ability to innovate. In our analysis we identify organizational interest to serve multiple user groups, which may reflect the presence of multiple organizational goals. While film institutes report a higher commercial use of their collections, performing arts collections are used educationally, archives and libraries focus on preservation while museums of art report the highest creative use. This indicates that institutions have a different understanding of the potential of adopting a digital work practice, as found by Navarrete (2014a), and therefore they focus their efforts on innovation solutions to serve a specific user group. The extent to which these alternative organizational goals compete for resources is not clear from our data - we can only observe a choice in innovation strategy.

4.6 CONCLUSIONS

Adoption of a digital work practice has become the essential first step for organizations wanting to innovate in the current information economy. Much attention has been given to the great force of the creative industry as drivers for innovation. Little is known, however, about the keepers and providers of the vast heritage and scientific holdings that serve to feed innovation. These heritage institutions, mostly publicly funded, appear to lag behind the digital transformation resulting in a great social loss.

Perhaps the most important discovery during our research was the unavailability of data on the subject. To date, the heritage sector relies on domain associations for the gathering, analysis and dissemination of statistics about the make up of organizations, such as IFLA and EGMUS. The ENUMERATE efforts are limited to the institutional response by country which, unfortunately, appear to lack a deep understanding of the benefits of such data availability for strategic analyses across European countries. We can only hope that further efforts to gather, analyse and disseminate data would increase awareness of the great advancements towards building a rich information environment in the Europe Union and increase response rate in the future.

Bakhshi and Throsby (2012) encourage sharing and publicising experimental findings to feed a learning culture, so that organizations learn from past efforts and together advance the sector. They also propose new public funding approaches to favour innovative projects. Our results suggest that institutions are still adopting the digital work practice and could benefit from sharing the learning experience. Further, the current funding system does not seem to favour sustainable solutions to enable sector-wide innovation.

5. CHANGE IN ACCESS AFTER DIGITISATION: ETHNOGRAPHIC COLLECTIONS IN WIKIPEDIA

5.1 INTRODUCTION

Museums, as well as all memory institutions, are charged with the collection and preservation of heritage collections to ensure access to present and future generations. This goal drives much of the decision making when allocating resources for the different organizational activities. The accent on how to ensure such accessibility and the quality of the engagement depend on the policy of the institution. Digitisation[17] has proven to be a key activity that supports the management and preservation of collections. It also increases access, as consumption broadens and deepens (Bakhshi and Throsby, 2012).

With the aim of increasing digital access to heritage by positioning collections where the consumers are,[18] a number of heritage institutions, including 25 from the Netherlands, collaborate with the Wikimedia Foundation, the online repository that feeds Wikipedia articles. Dutch heritage institutions have published over half a million objects in Wikimedia, representing close to 2.4% of all Wikimedia content (Brinkerink, 2015). Launched in 2001, Wikipedia has been ranked among the ten most popular websites on the Internet. The more than 35 million articles written in Wikipedia receive about 17 billion views per month, out of which more than 400 million are unique visitors.[19] Wikipedia's considerable traffic signals its position as highly preferred information site for online consumption.

The consumption pattern of all cultural content, such as films, books or music, generally present a long tail where few products are largely popular, while the majority of content remains obscure. The mechanics of selection and further popularization of the content has been attributed to quality information signals that help consumers make a choice, including rankings, prizes, recommendations and reviews (Clement et al., 2007; Chevalier and Mayzlin, 2006; Ginsburgh and Ours, 2003; Potts et al., 2008; Walls, 2010). Information to signal quality, as well as contextual information, is of essence when positioning digital heritage content in the crowded social networked environment online. This is because of the hedonic characteristics of heritage and of information, digital heritage being a mix of the two.

The consumption patterns of information on Wikipedia largely respond to an encyclopaedic use, which explains the drops during summer and winter holidays (Ratkiewicz et al., 2010b), as well as to critical events, such as a market crash, elections, earthquakes or the Oscars (Ratkiewicz et al. 2010a), but also annual celebrations such as the Ramadan and Christmas. For entertainment and biographical content, two of the most preferred topics, consumption remains otherwise stable (Spoerri, 2007b, Lehmann et al., 2014). A clear understanding of the consumption patterns of heritage content found in Wikipedia articles is missing.

[17] Digitization is defined as "the process of converting analogue to digital data, with the purpose of enabling data processing, storage, and transmission through digital circuits, equipment, and networks" (RICHES taxonomy available at http://www.digitalmeetsculture.net/projects/riches/virtuality/#d).

[18] A unique effort to make available all the paintings in a country in one single website was the *Your Paintings* project of the UK. It "dramatically improve[d] public access to paintings in the Channel Islands, England, Isle of Man, Northern Ireland, Scotland, and Wales." The project was headed by the Public Catalogue Foundation in partnernship with the British Broadcasting Corporation (BBC) (Baca, 2013:152).

[19] Views per month vary, the highest has been recorded at over 22 billion on September 2014 (http://stats.wikimedia.org/EN/TablesPageViewsMonthlyCombined.htm). For more on Wikipedia see https://en.wikipedia.org/wiki/Wikipedia.

This study provides unique insights on the consumption pattern and consumer preference in an online environment and how it can support decision-making not only during the allocation of resources but also during the drawing of a digitisation strategy. The large number of consumers visiting the Wikipedia environment represents a portion of the large Internet information market potentially exploitable by heritage institutions. The limited presence of heritage materials is an opportunity loss, suggesting a challenge to understand the dynamics of the medium and adopt the platform. We illuminate the relationship between cultural consumption patterns online and onsite, by availing partly of new tools that enable analyses of consumer behaviour around the content provided by galleries, libraries, archives and museums (the so-called GLAMs).

In this part, we focus on two specific questions: first, we explore the changes in consumption after digitisation by comparing physical exhibition and publication in an open data environment. We analyse object mobility and visibility. Second, we try to explain the differences in preference of consumption by analysing patterns of object selection. We find that the long tail that characterises onsite heritage consumption is also found in a digital environment but that preference has a different rationale. Where 3D objects are most popular in the physical exhibition hall, preference in the digital environment goes for 2D objects. This may be explained by the limitations in technology that constraint 3D manipulation. We further find a preference for quality environments including rich and diverse content (Wikipedia articles including multiple images from multiple sources). A disparity is found in preference for language where the number of Wikipedia articles is higher in Indonesian, whereas the number of views is higher in English, suggesting further growth of information markets. We also find an exponential increase in consumption when moving into the digital realm, where the onsite environment is limited to a number of exhibits a year, the online environment allows unrestricted access 24/7 from across the (digital) globe representing an important complement to collection accessibility.

Results contribute to the empirical research on consumer behaviour and heritage consumption preference, particularly of hedonic products (content) available free of charge in the online market. We further contribute to the understanding of non-profit organizations, with focus on museums and on the Wikipedia environment.

Section 5 is organised as follows. We first review the literature on the long tail and on consumption of hedonic products in section 5.2. In section 5.3 we review the literature on consumption of Wikipedia content across topics and languages. In section 5.4 we present the data and describe our method. Section 5.5 holds the quantitative analysis of the data followed by a discussion in section 5.6. We end with conclusions in section 5.7.

5.2 LONG TAIL AND HEDONIC GOODS

The so-called long tail has been used to refer to the growth of niche markets that expand beyond the traditional best sellers and include obscure products. Brynjolfsson et al. (2011) argue that the Internet supported a shift where traditionally 20% of the products generated 80% of the market to a long tail where a larger percentage of products are available to consumers. They argue that the long tail is made possible by a larger selection of products being made available online (which is not physically possible onsite) and by the availability of product information that facilitates selection of alternative products.

A study conducted by Peltier and Moreau (2012) showed that online sales present a long tail with lower head and a thicker tail than onsite sales, meaning that the best sellers onsite perform less well online while the low-seller books do better online (particularly the bottom 40%). However, top sellers onsite (99th quantile) present no difference and sales remain stable. The trend, which is first visible in the online market, increasingly can also be found in the onsite market, representing a shift of consumer behaviour: purchase decisions shift from best sellers to medium- or low-sellers. This is because the Internet facilitates distribution of content. "The long tail economy is thus based on sales strategies for niche content (old titles, specific segments, particular version), which previously had been largely ignored due to insufficient distribution level" (Benghozi and Benhamou, 2010:45). The products being looked at here are hedonic goods, which are multisensory and provide for a consumption leading to fun, pleasure, and excitement, as opposed to utilitarian goods, that are motivated by functional product aspects.

Benghozi and Benhamou (2010) stress the role of the distribution channel to present information to facilitate (or hinder) selection and eventual consumption. Distributors need to update the information about the products to best fit the changing environment (what can be referred to as editorialisation or information curation) as well as to continuously improve the technology to allow selection of products. Selection is, according to Mackenzie Owen (2007), the key determinant in the market of information. From the supply side, producers select what to make available and how, while on the demand side, consumers select where to search and eventually what to consume. Consumers increasingly expect rich environments that allow reuse, so that distributors that provide engagement are favoured.

Developing and improving rich engaging environments is costly. A research project that focused on audiovisual content identified excessively high costs related to the transcoding, storage, broadband, and the legal fees required to provide content on-demand and one-on-one services. The popular content cannot cross subsidize the rest of the long tail so that government financing is required, argued Ongena et al. (2012). The authors characterized the audiovisual long tail based on the type of content and identified the head of the tail to contain live shows, followed by video-on-demand (including content on YouTube and DVD) and cultural heritage at the end of the tail. They state that the audiovisual long tail unceasingly grows as content ages and becomes part of a nation's cultural heritage.

Additional information remains key to increase use. A study on the selection pattern of information online found that consumers choose to click a query result more often when longer information is provided, whereas single URL results receive less clicks (Zhang and Kamps, 2010). Digital heritage collections, being cultural information goods, heavily rely on additional information that can take the form of branding, sampling, signalling, and alternative information markets to guide consumer choice (Clement et al., 2007). Consumption of products found in the long tail heavily relies on communities of critics and users that serve to share and to recommend information, so that as niche content becomes available within a community there is a greater chance of reuse. That is, web communities are influential in the distribution of consumption.

Potts et al. (2008) identified the choice of other consumers as determinant for production and consumption in the cultural industries. That is, "individual choices are dominated by information feedback over social networks rather than innate preferences and price signals" (p.170). This is, they argue, because of the novelty of content and technology that carry high uncertainty in the new market.

In contrast, consumers with known preferences characterize mature markets. Potts et al., further propose the agent-network-enterprise model of analysis as key to understanding of social network markets, their dynamic values and role as innovation systems.

Empirical economic research has identified quality signals that support consumer choice. Quality indicators are often linked to rankings (e.g., Ginsburgh and Ours, 2003). In the case of books, reviews, prizes, bestseller lists and sample chapter publications have been identified to influence consumer choice (Ashworth et al., 2010). Sorensen (2007) found the New York Times bestseller list to slightly increase average book sales and Berger et al. (2010) found book reviews, both positive and negative, in the New York Times increased sales. Ponzo and Scoppa (2015) found that receiving the Strega Prize increased book sales. Clement et al. (2007) point to the key role of reviews, both positive and negative, and word-of-mouth to provide additional information on the book and thus reduce quality uncertainty. Chevalier and Mayzlin (2006) found word-of-mouth online to be influential in book sales at the main online bookstores. On the contrary, Walls (2010) found no relation between DVD sales of film content and additional information signals (e.g. ranking lists) found in traditional film screenings. Rather, higher sales were directly related to the longevity of distribution.

Regarding quality of content, Clement et al. (2007) identify literary prices to signal a highbrow content, which may be considered less attractive by lowbrow consumers. The same may be true online, though this is yet to be documented empirically. As museum websites and cultural portals (e.g. Europeana) reflect a highbrow profile, consumers seeking lowbrow content may prefer sites such as Wikipedia.

Though there is a substantial body of empirical research on the popularity, and long tail, of hedonic goods, little has been done on the heritage collections found in libraries, museums and archives. This research aims to fill this void by selecting the ethnographic collections of the Dutch National Museum of World Cultures as case study to analyse heritage consumption in the market of information found online.

5.3 CONSUMPTION PATTERNS IN WIKIPEDIA

Since its launch in 2001, Wikipedia has grown to become a key source of data online and feeds. The Wikipedia content, found in 35 million articles in close to 300 languages, is a rich source of data in the expanding Linked Open Data cloud. Projects like DBpedia or WikiData extract structure and make the content available in a machine-readable format that facilitates reuse, such as Goggle's Knowledge Graph (Lehmann et al., 2015). The Wikimedia Foundation servers receive millions of requests daily to the Wikipedia content, accounting for 49.5% of requests, while the uploaded resources such as images and other multimedia resources receive 47% of requests, adding up to 96% of all traffic (Reinoso et al., 2012). Images, and multimedia, are an important part of the content delivered by Wikipedia.

An indicator of popularity to the Wikipedia site can be identified in the number of views, with more than 400 million unique visitors per month in May 2015.[20] In 2009, the average daily views to the English edition reached 108.5 million, accounting for 46.5% of all traffic (Reinoso et al., 2012). Article views generally present cycles, with lower traffic during the weekend and holiday periods and higher traffic during school exam periods, suggesting use within an educational setting particularly for pages like "biology" (Ratkiewicz et al.,

[20] For example, such as the Wikimedia Report Card (https://outreach.wikimedia.org/wiki/GLAM/Resources/Tools).
[20] http://reportcard.wmflabs.org/.

2010b). Recent studies have tried to explain the consumption patterns of the various articles and languages. Lehmann et al. (2014) quantified the preference of producers reflected in the length of the article as well as the preference of consumers reflected in number of views. They focused on the biographical articles in the English Wikipedia, representing a popular topic on the largest edition, and found that biographies of historical figures, general history, places and culture were rated among the 500 most popular articles. They found most articles had stability in the reading pattern and that changes were related to a temporal event or due to an increase or decrease in the popularity of the person. Geography, history and politics are highly popular topics, which Spoerri (2007a) defines as prototypical encyclopaedia topics.[21] It can be expected that these topics contain images from heritage organizations as collections tend to document history, places and culture.

Reinoso et al. (2012) found differences in the behaviour per language, where views to Wikipedia pages in English correlated to the size of the articles, both being the largest in comparison with other languages. Whereas, Spanish Wikipedia has fewer articles but receives proportionately a much greater traffic and the highest rate of growth (edits to articles). Another study by Reinoso, Leon and Ortega-Valiente (2012) found differences in the type of content popularity of views and contributions per language. Articles about geography were most viewed among the German and French editions and most edits were found among German, French and Spanish editions. Articles about arts and humanities were most viewed in the Spanish and French edition while most edits were found in the French edition. Arts and entertainment articles were most viewed in the German, English and French editions while most edits were found in the Spanish edition. This suggests a different preference between the consumers and producers. It may also reflect a difference in the development of the Wikipedia editions in each language, though this has not been quantified.

Spoerri (2007b) identified the preference in topics based on views ranking to Wikipedia pages in English in the second part of 2006. He found the topic entertainment (including music, films, comics, performers, TV series, video games and books) to be the most popular topic within the top 100 Wikipedia pages viewed, followed by politics and history, geography and the arts. Surprisingly, no mention was made of annually recurring events such as Ramadan or Christmas, both accounting for an increase in traffic during June 2015 and December every year respectively. Ratkiewicz et al. (2010b) quantified popularity of content based on the number of hyperlinks found in an article. They found an increase in traffic to articles after their creation but found decay in the views thereafter. Popularity of page views has been found highly sensitive to *critical* events (Ratkiewicz, et al. 2010a) but also to the featuring of an article on the Wikipedia home page (Gyllstrom and Moens, 2012). Bursts on article views can be linked to "appropriately chosen queries on Google Trends, suggesting that these bursts are often driven by external events" (Ratkiewicz et al., 2010b:295). One such example is the beer poisoning taking place during a funeral in Mozambique in 2015.[22] Finding the *appropriate* query terms may be possible for articles related to critical events but can prove challenging when exploring the use of articles containing heritage collections content.

[21] Categories of Wikipedia pages generally include Entertainment, Politics, History, Geography, Sexuality, Science, Computers, Arts, Religion, Holidays, Current events, and Drugs as key topics (here in order of popularity as found by Spoerri, 2007b).
[22] https://en.wikipedia.org/wiki/Mozambique_funeral_beer_poisoning.

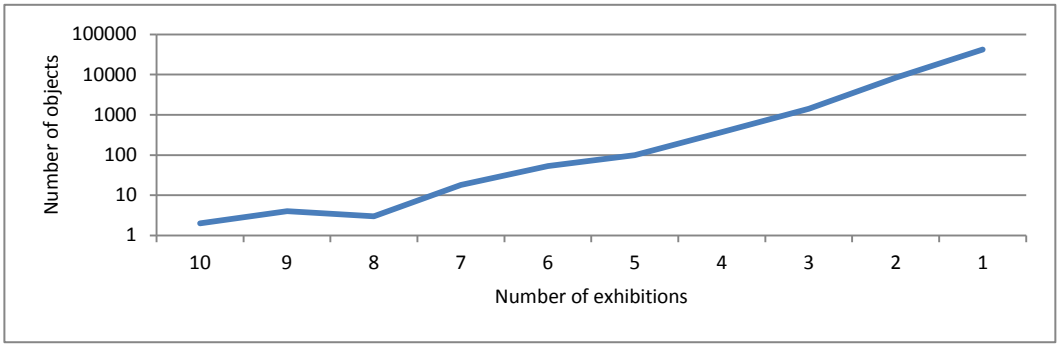
Number of page views, edits, users and collaborative rigor found in Wikipedia articles has been linked to the popularity and box success of films (Mayestyan, Yasseri and Kertesz, 2013). No research was found to date on the link between Wikipedia and heritage collections from galleries, libraries, archives and museums. We hope to contribute to this discussion by presenting our results on the use of Dutch ethnographic collections in the top seven Wikipedia languages.

5.4 DATA AND ANALYSIS

5.4.1 Object accessibility

The Tropenmuseum is the ethnographic museum in Amsterdam that has recently joined two other ethnographic museums to form the Dutch National Museum of World Cultures (NMWC)[23]. Together they hold a collection of 600,000 objects.[24] The NMWC has a joint digital database, The Museum System (TMS), which serves to document activity around the objects, including exhibitions. A query was conducted in TMS to identify the objects that were exhibited more than once since 1927, the year when the museum opened in its current location. This resulted in a long tail (see Fig.1) where 51,988 objects were exhibited at least once, while 547,700 were never exhibited.[25]

FIGURE 5.1 The long tail of physical exhibitions at the NMWC (logarithmic scale)



Source: Own, database query on April 2015.

The collected data gives unique insights on the mobility of objects held in the collection by NMWC since 1920s. It is important to remember that we depend on data reported and kept in the institutional database during almost an entire century. There has been a lot of work done to document and digitize all information about the objects, though we find that the documentation practice has changed throughout the years. For instance,

[23] The Dutch Museum of World Cultures is the RICHES partner with the project short name of RMV Leiden that also featured in the project's co-creation task.

[24] The Tropenmuseum has a collection of 369,000 pieces, of which 153,000 are part of the Material Culture (objects including visual collections like drawings, paintings and documents) and 216,000 are photographic material (including photographs, albums, slides and negatives). The Tropenmuseum joined the National Ethnographic Museum and the Africa Museum to form the National Museum for World Cultures in 2014. Together, they house 600,000 pieces, of which 367,000 are Material Culture and 230,000 are photographic material. The Tropenmuseum was further the first Dutch museum to collaborate with the Wikimedia Foundation in 2008.

[25] On a first view, object mobility may appear low at the Tropenmuseum. If we consider object mobility is driven by a wish to transfer knowledge, the Tropenmuseum has a unique international role facilitating knowledge transfer beyond the mere movement of objects. Museum staff have conducted numerous visits and training programs to support the use of best practice on collection management in Asia, Africa and the Americas. That is, a complete assessment of mobility ought to include a broader definition of the transfer of information.

objects in the permanent exhibition hall have been documented as being in several exhibits, for periods lasting 6, 8, 14 or 23 years depending on the practice of the registrar. The Tropenmuseum holds 27 objects that have been in more than 6 temporary exhibitions, most of which are thus objects part of the permanent exhibit.[26]

In order to compare the long tail onsite and online, we selected a digital environment where collections were available for the general public, instead of the organizational website or related heritage portal. We selected Wikimedia as an alternative online environment because of its sustainable accessibility (15 year history) and potential future comparison with other collections. Data on access to objects is publically accessible and measured harmoniously across collections, which is not always the case when comparing institutional web statistics. The Tropenmuseum has published close to 50,000 objects in Wikimedia.[27] From the 27 objects exhibited more than six times, only nine were also published in Wikimedia. Those nine objects were included in 26 exhibits, were featured in 48 publications, and were included in 12 Wikipedia articles. These can be considered the most viewed objects physically. We selected the objects with Wikipedia articles in more than two languages, leaving a selection of four objects (see Figure 5.2 for thumbnails). We also selected one additional object due to its extreme popularity online, prison feet cuffs (object #5).

FIGURE 5.2 Top 5 most viewed objects onsite (thumbnails)

#	Main Wikipedia article	Type of object	Date of creation	Total # onsite exhibits	Total # Wiki articles	Total # Wiki languages
1	Kakawin Sutasoma	Gold piece	1295-1525	7	4	3
2	Pustaha	Wooden book	1852-1857	8	6	5
3	Singa	Magic horn	1852-1857	7	2	2
4	Gong	Hanging gong	1939	6	73	5
5	Slavery	Prison feet cuffs	1971	1	348	4

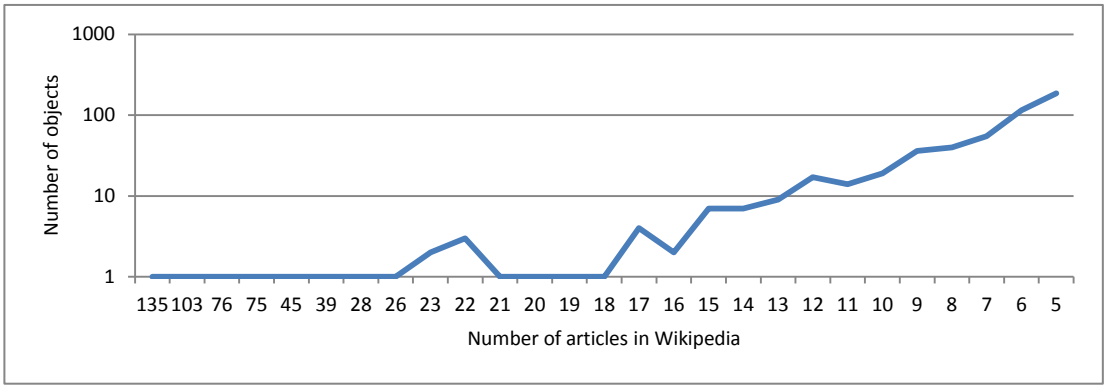
Table 1. Overview of top popular objects onsite

[26] Querying the exhibited objects was preferred to objects on loan because of the interest to quantify the audience size. Objects on loan can be exhibited or displayed but can also be part of a research project, can be used as decoration, can be photographed, can be used for communication, can be restored, or can be in storage. Objects on loan to the office of the director do contribute to the increase in object visibility but visits are not quantified. The same is true for all other loan type activities. However, viewing the total loan activity shows a different pattern, where 28,003 objects were on loan more than once. Further, number of publications and access to the library were alternative collection access points not harmoniously quantified in the same time period.

[27] The Wikimedia Foundation began the GLAM-Wiki initiative (galleries, libraries, archives, museums with Wikipedia) to support the reuse of heritage collections within Wikipedia, the online encyclopaedia written by volunteers. There are currently over 194,000 images from heritage institutions available as open data in the Wikimedia repository (http://en.wikipedia.org/wiki/Wikipedia:GLAM/About).

We then identified the most viewed objects online from a dataset kept by the Wikimedia Foundation covering the last five years. We used two tools developed by Magnus Manske for the Wikimedia Foundation. The *GLAMorous* tool counts the articles containing a certain image from the Commons category in all Wikimedia projects (e.g. Wikipedia, Wikibooks, Wikidata), and the *BaGLAMa2* tool counts the number of views in articles containing images in a Commons category.[28] Data is collected monthly, growing as Commons categories are added. The category *Images from the Tropenmuseum* is among the longest datasets (started on March 2010) totalling 52 months, due to a few data collection gaps. From the close to 50,000 objects from the Tropenmuseum available in Wikimedia, 5,815 images are being used in at least one Wikipedia article (see Fig. 2 logarithmic scale).

FIGURE 5.3 The long tail of digital articles in Wikipedia – NMWC collection (logarithmic scale)



Source: own, GLAMorous tool query on April 2015.

Using the *GLAMorous* tool, we identified the objects that were used more than 23 times in Wikipedia, resulting in 17 objects. A query was then conducted to identify the presence of those objects in physical exhibitions resulting in 11 objects, as we were interested in measuring changes in access after digital publication. These 11 objects can be considered the most viewed objects online that were also seen onsite. From the most viewed objects online, we selected those that were found in Wikipedia articles in more than 2 languages resulting in a selection of 3 objects. We included two other objects due to their particular role in Wikipedia and therefore significance in our research, one being the only photograph available of a living bird now extinct, the Blue-faced rail, though the photograph was never exhibited (object #8), and a photograph of two men cutting a tree in Borneo, being one of the most popular Tropenmuseum images in the French Wikipedia representing history and geography (object #10). The description of top viewed objects online is presented in Table 2 with thumbnails in Figure 5.4.

[28] The GLAMorous tools is available at https://tools.wmflabs.org/glamtools/glamorous.php, the BaGLAMa2 tool is available at https://tools.wmflabs.org/glamtools/baglama2/index.html.

FIGURE 5.4 Top 5 viewed objects online (thumbnails)

#	Main Wikipedia article	Type of object	Date of creation	Total # onsite exhibits	Total # Wiki art.	Total # Wiki lang.
6	Kris of Knaud	Photograph of Javanese Prince	1983	1	3	3
7	Women in Morocco	Photograph of Berber woman	1940-1960	1	7	5
8	Gymnocrex	Photograph of Blue-faced rail	1949	0	23	19
9	Piercing	Photograph of two Kenyan Dayaks	1920	1	12	8
10	History of Madagascar	Photograph of men cutting tree in Borneo	1900-1940	0	15	3

Table 2. Overview of top popular objects online

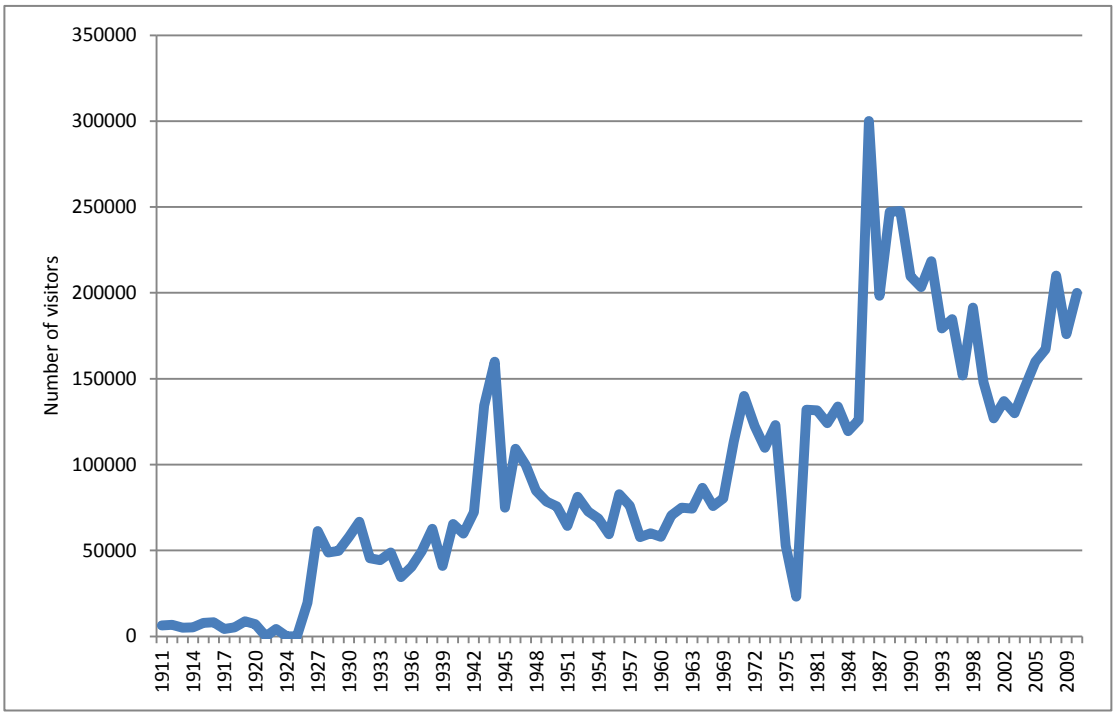
The final selection containing the 5 most viewed objects onsite (1-5) and online (6-10), from the 600,000 objects that were both exhibited onsite and were available online, is as follows: a gold engraving of Lord Sutasoma (object #1), an illuminated book known as Pustaha (#2), a decorated horn (#3), a hanging gong (#4), prison feet cuffs (#5), the photograph of a Javanese prince (#6), the photograph of a Berber woman (#7), a photograph of a Blue-face rail (gymnocrex) (#8), a photograph of two Kenyan Dayaks (#9), and a photograph of two men cutting a tree in Borneo (#10). All photographs are black and white. The objects selected represent five 3D objects and five 2D objects.

Using the *BaGLAMa2* tool, we gathered the data on numbers of views of articles containing the selected images in the most popular languages, these being English (EN), German (DE), French (FR), Indonesian (ID), Dutch (NL), Japanese (JA) and Spanish (SP). We then identified the articles on those languages containing the ten selected objects (see Table 1 and 2). Some of the articles contained several images, such as the Japanese Gamelan article containing 42 images, of which 14 were from the Tropenmuseum, or the French Berbers article containing 83 images, with only one image from the Tropenmuseum yet prominently located in the top right box (see Figure 5.A10 in annex). In total, we analysed the views of 51 Wikipedia articles containing 95 objects from the NMWC (for an overview of all websites and objects followed see list C in annex).

5.4.2 Object visibility

We then reviewed the Tropenmuseum's archive to identify the number of people visiting the exhibits containing our selection of the most popular objects on view. We found two major visitor surveys that outlined the socioeconomic make-up of the visitor population in the 1950s, and the annual reports with visitor numbers. Figure 4 shows the visitor numbers from the Tropenmuseum from 1911 to 2010 based on the annual reports.

FIGURE 5.4 Tropenmuseum visitor numbers (1911-2010)



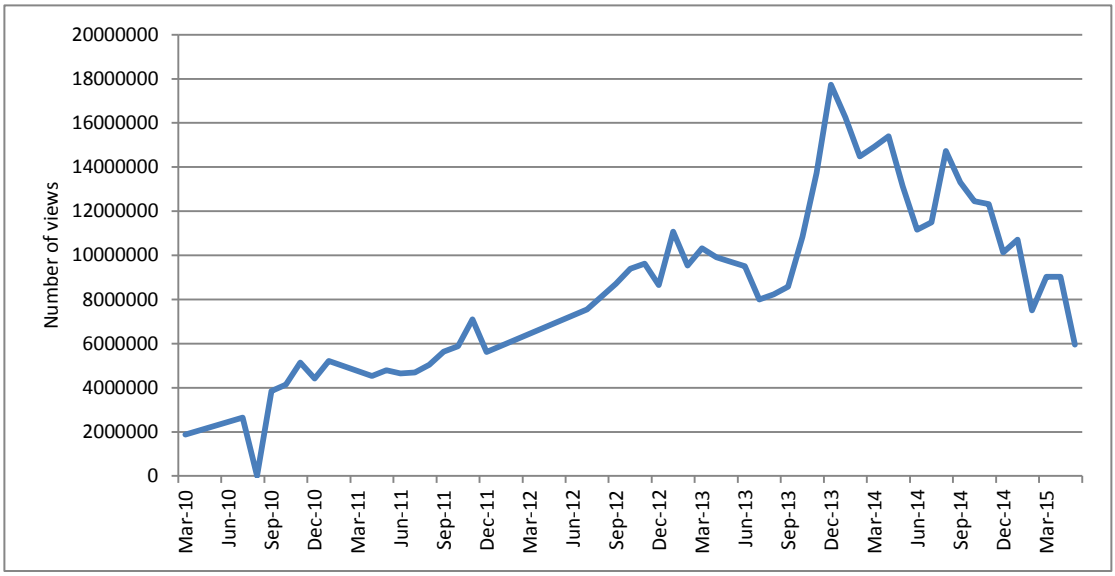
Source: own, Tropenmuseum annual reports.

From the graph, important events can be quickly identified in the museum's last 100-year history. First, the museum moved from Haarlem to open at its current location in Amsterdam in 1927 with a visible change in visitor numbers towards a general upright slope since. A peak can be found during the German occupation in 1944, to be followed by a drop after liberation in 1945, presumably as citizens were busy reconstructing the post-war country.[29] Gradually, visitor numbers grew to peak in 1971 with the *Orchids* exhibit. A significant drop is visible during 1976 when the museum was closed for renovation. The most popular year up to date was 1986, when the Tropenmuseum received 300,000 visitors for the exhibitions *Indigo* and *The Human Story*. A decline in visitor numbers reached its lowest in 2000 after which an upward slope can be observed. Cumulatively, the Tropenmuseum has received 8.4 million visitors onsite during the last century.

[29] Data from the Statistics Netherland show that overall Dutch museum visits almost doubled after the Second World War, and after the Dutch Independence in 1952 museum visitor numbers more or less stabilized. The Tropenmuseum, together with the Rijksmuseum and the Stedelijkmuseum were the 3 most visited museums in Amsterdam, accounting for 85% of all visitors in 1950.

In comparison, we used the *BaGLAMa2* tool to identify the visitors online, represented by views of Wikipedia articles containing the Tropenmuseum collection. Figure 5.5 shows the number of views of all Wikipedia articles containing at least one image from the Tropenmuseum, starting since May 2010 (52 months). Cumulatively, the Tropenmuseum has received 448.3 million visitors online in the past 5 years.[30]

FIGURE 5.5 Wikipedia article views from category Images from the Tropenmuseum (May 2010-June 2015)



Source: BaGLAMa2.

The graph shows gaps in data collection from May 2010 until July 2012, after which data is collected monthly. Also, a general growing slope can be found with peak on December 2013, with 17.7 million views, followed by a downward slope. The reasoning behind the decline in visitor numbers on Wikipedia articles containing images from the Tropenmuseum may be related to the increase in mobile views, not captured by the *BaGLAMa2* tool, which can be observed in the general use of Wikipedia.[31] A similar declining trend can be seen in the English, German, Dutch, French and Spanish Wikipedia page views, as in most languages, though with an earlier peak on February 2013 to be followed by a downward slope. The downward slope observed in all languages, and in spite of the increase in mobile use, may also reflect Google's use of the Knowledge Graph, available on December 2012 in English, German, French and Spanish.[32] Since then, Google displays key information from Wikipedia into a box on the top right of the browser, presumably satisfying the user's questions who decreasingly clicks further into the Wikipedia article. The Indonesian Wikipedia does not present this trend, as Google's knowledge graph is not available in that language, and page views continue to increase instead.[33]

[30] In comparison, the Tropenmuseum collection website has received an average 50,000 page views per month in the last two years.
[31] The use of mobile allows for a more precise understanding of the sections viewed, as each section title can be clicked and expanded if desired. The Wikimedia Foundation is currently exploring tools to account for media view and for mobile access.
[32] See more on Google's Knowledge Graph on https://en.wikipedia.org/wiki/Knowledge_Graph.
[33] For information on Wikipedia page views per language see http://stats.wikimedia.org/EN/ReportCardTopWikis.htm#lang_fr.

The degree to which the downward slop is caused by the increase mobile use or by Google's Knowledge Graph is hard to quantify with the currently available dataset.

Table 3 shows the overview of object visibility onsite and online of the selected sample (in the top 7 languages). Objects onsite received an average of 2,223 views per exhibit per year while objects online received 8,439 views per article per year.

Table 3. Object visibility onsite (100 years) and online (5 years) of top viewed objects

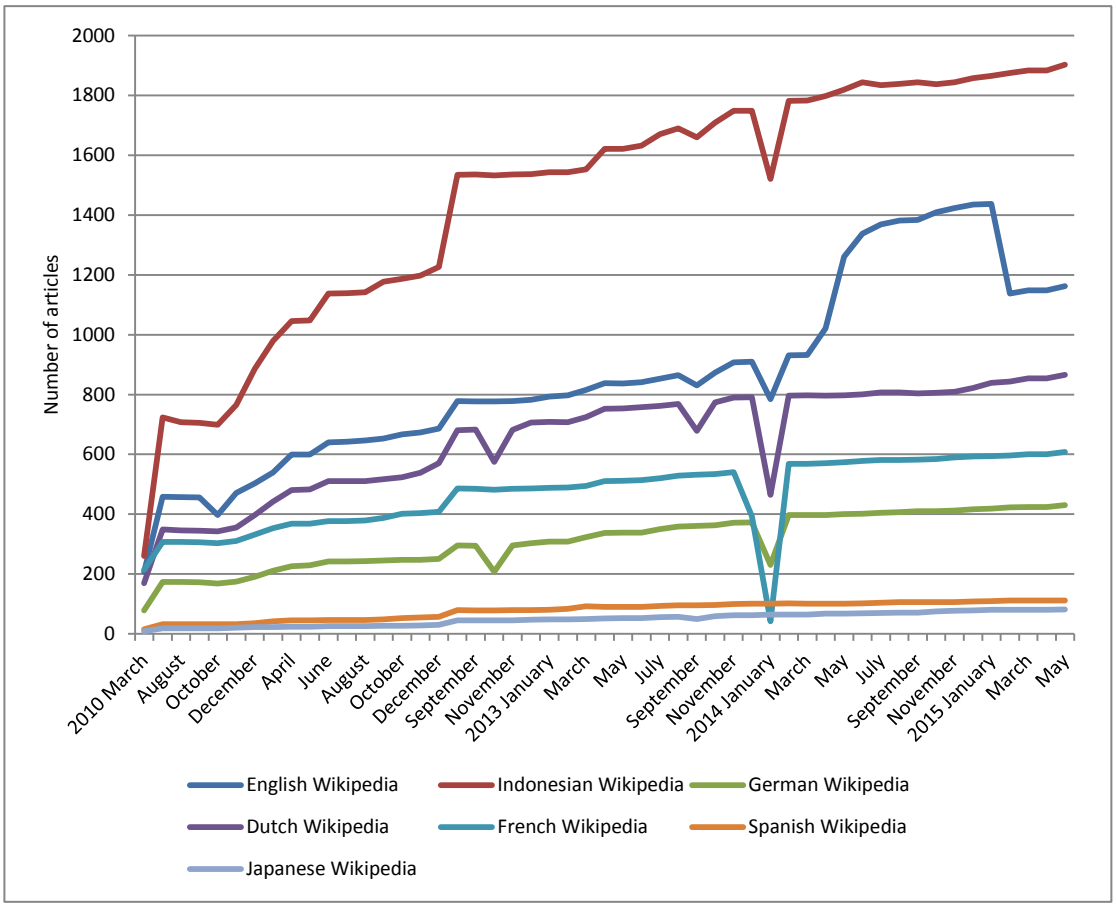
	#	Total # views onsite (exhibitions)	Total # exhibitions	Average views per exhibit	Total # views online (Wikipedia)	Total # Wikipedia articles	Average views per article
Top objects onsite	1	5020773	7	717253	116287	4	29072
	2	5155688	8	644461	32353	6	5392
	3	4984913	7	712130	24578	2	12289
	4	152698	6	25450	589693	73	8078
	5	0	1	0	1656051	348	4759
Top objects online	6	50850	1	50850	7965	3	2655
	7	50850	1	50850	654984	7	93569
	8	0	0	0	10991	23	478
	9	50850	1	50850	2590326	12	215860
	10	0	0	0	2288708	15	152581

Source: Own, based on Tropenmuseum annual reports, BaGLAMa2.

5.4.3 Wikipedia context

Using the *BaGLAMa2* tool, we were able to identify the number of pages made containing Images from the Tropenmuseum and the number of views to each one of those pages for a period of 52 months (from May 2010 to June 2015). Figure 5.6 shows the number of pages made in the seven most popular languages (English, Indonesian, German, Dutch, French, Spanish and Japanese). From the graph, a general upright slope can be observed, with a technical gap in the dataset on selected months, including January 2014. The dramatic rise and drop observed on the English Wikipedia in March 2014 and at the start of 2015 respectively may reflect a change in the position of the images (e.g. added or removed from being used as navigation icon for a category) but this has not been identified. The general trend of views of the English version, excluding the 2014 peak, has an upward slope similar to the rest of the languages. As of June 2015, there were a total of 11,458 Wikipedia articles including Images of the Tropenmuseum, of which 5,187 (or 45%) are in the top seven languages where Indonesian is the most popular Wikipedia language being edited (has more articles written), followed by English, Dutch, French, German, Spanish and Japanese.

FIGURE 5.6 Number of Wikipedia pages containing NMWC collection (top 7 languages)

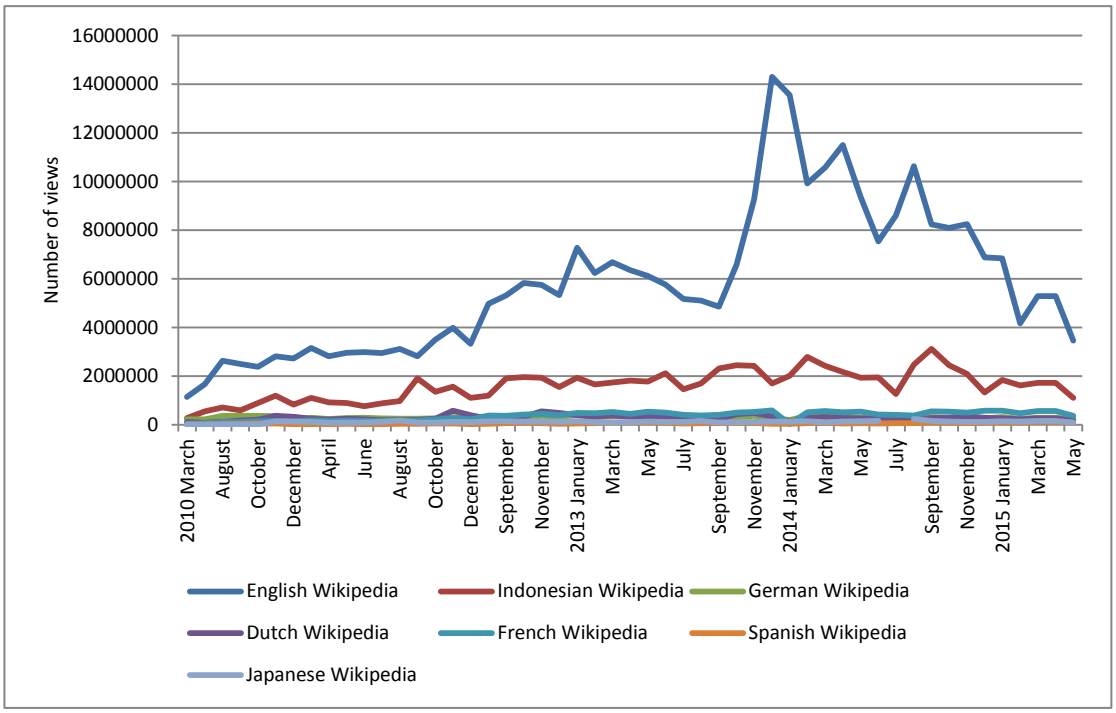


Source: BaGLAMa2.

Figure 5.7 shows the number of views per Wikipedia language in the same period. Noticeable is the visible preference towards the English Wikipedia articles, followed by Indonesian and all other languages. This may be explained by the size of the general English Wikipedia, being the largest edition (representing 51% views and 14% articles of the total Wikipedia), and by the prominent use of English in many countries across the globe. The peak on December 2013 may reflect a particular event, not identified in our dataset, as well as special features and programs, such as the collaboration with WikiAfrica.[34]

[34] https://en.wikipedia.org/wiki/Wikipedia:WikiAfrica/Share_Your_Knowledge/Tropenmuseum.

FIGURE 5.7 Wikipedia articles views containing NMWC collection (top 7 languages)



Source: BaGLAMa2.

Data show a striking difference between the preference of editors, predominantly working at the Indonesian and English versions, and of readers, being significantly higher in English. Table 4 shows the use of Wikipedia in the top seven languages containing the NMWC collection. English remains by far the preferred version for global consumers.

Table 4. Wikipedia views and articles (total and NMWC) in June 2015

Language	Total articles (in millions)	% of total	NMWC articles	As % of NMWC	Total page views (in millions)	% of total	NMWC page views (in thousands)	As % of NMWC
English	4.9	14	1168	10	8266	51	4031947	62
German	1.8	5	431	4	1114	1	276339	4
Japanese	0.9	3	83	1	1326	8	120816	2
Spanish	1.1	3	115	1	1230	8	95850	1
French	1.6	5	614	5	776	5	413442	6
Dutch	1.8	5	866	8	190	1	211029	3
Indonesian	0.3	1	1910	17	115	1	928156	14
Total	35.4		11458		16296		6517768	

Source: adapted from https://stats.wikimedia.org and BaGLAMa2.

5.4.4 Correlation of object views

In order to understand the influencing factors increasing object views, we ran a simple linear regression with robust standard errors where object views was a function of the number and length of exhibits and online publication as well as of characteristics found in Wikipedia articles, including language, number of images, and topic. We used the 95 objects from the NMWC found in 51 Wikipedia articles as data set, some objects being present in more than one article, totalling 140 observations. Table 5 shows the results. The first model is a simple OLS regression of total views (column 1) and average views per month (column 2). A second pair of models contains additionally type of object fixed effect (columns 3 and 4), so that objects in the same website in multiple languages or multiple NMWC objects in one single website were accounted for. The third model includes in addition type of object (2D, 3D, video and text) fixed effects (columns 5 and 6), in order to account for the unobservable fundamental differences across types of object.

Table 5. Object view as function of exhibits and inclusion in Wikipedia articles

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
VARIABLES	Total views	Average Views/mo	Total views	Average Views/mo	Total views	Average Views/mo
Total months	4,279***		6,488***		9,642***	
	(1,559)		(2,011)		(2,222)	
Total images	25,138**	1,071**	23,120	1,052***	57,176***	2,937**
	(11,653)	(491.7)	(15,333)	(344.1)	(11,144)	(1,427)
NMWC images	-42,865**	-1,718**	-43,363	-1,810**	-27,464**	-2,037*
	(20,486)	(751.5)	(31,325)	(709.8)	(12,601)	(1,081)
Total exhibits	-26,625**	-734.3**	-5,546	-1,096	9,027	424.4
	(12,284)	(369.5)	(13,175)	(820.3)	(25,325)	(480.2)
Crowdsourced	-227,302**	-5,937*	56,139	1,783	136,402**	7,693*
	(104,507)	(3,050)	(34,910)	(1,699)	(63,355)	(4,454)
Language DE	405,883*	22,881*	255,539*	23,956***	1.546e+06***	87,885**
	(231,672)	(12,583)	(126,758)	(2,242)	(401,085)	(41,917)
Language EN	607,538**	24,551***	678,728*	24,393***	1.646e+06***	73,626**
	(242,182)	(9,102)	(360,164)	(7,882)	(400,391)	(34,389)
Language ES	155,055	12,899	160,926	12,618***	1.556e+06***	76,551**
	(243,188)	(11,283)	(141,747)	(3,811)	(409,877)	(36,359)
Language FR	218,207	9,729	167,959	8,196	1.726e+06***	81,545**
	(324,295)	(12,411)	(280,788)	(8,931)	(426,058)	(38,751)
Language ID	491,018**	19,058**	548,627**	19,250***	1.918e+06***	83,850**
	(211,227)	(9,141)	(206,366)	(4,132)	(482,599)	(40,023)
Language NL	421,684*	18,678*	349,274	17,135**	1.796e+06***	80,811**
	(224,828)	(10,381)	(299,611)	(7,661)	(472,605)	(38,013)
Topic culture	24,894	-1,239	60,090	-1,283		
	(139,450)	(5,328)	(110,084)	(3,094)		
Topic geography	1.398e+06***	36,279***	1.219e+06**	33,502***		
	(387,462)	(12,907)	(429,342)	(10,522)		
Topic history	229,137	1,265	-73,045	-3,403		

	(203,112)	(7,974)	(185,234)	(4,666)		
Topic sexuality	22,118	-4,987	46,804	-4,624		
	(182,646)	(7,601)	(129,582)	(3,436)		
Observations	140	140	131	131	140	140
R-squared	0.438	0.499	0.340	0.420	0.936	0.867
Type of object FE			Yes	Yes	Yes	Yes
Website FE					Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Not surprisingly, the longer the object was on view online, the higher the coefficient for total views. The quality of the article appears to positively influence the number of views. We find that object views increase when more images are present in the article. We suggest that articles that have a larger number of images have had a longer time to develop and therefore have richer and more mature content, reflecting a higher quality. This is not the case, however, when there are many images from the NMWC museum, as this results in most regressions in a significantly negative coefficient. The high number of images from one source may be linked to one editor preference for content rather than quality of the article and therefore works against the popularity of the article. Further, consumers tend to value diversity (Ranaivoson, 2012), perhaps as additional signal of a developed product, in this case to signal quality of the Wikipedia article. Onsite number of exhibitions is negatively related with the number of views. This may come as a surprise, but could be partly driven by the low variation and a high number of zeros in this explanatory variable. Furthermore, when we accounted for type of object, the negative coefficient disappears (though positive is not significant). This can be explained by the preference of 2D objects online, which have little visibility onsite as preference is given to 3D, and vice versa. Similarly, crowdsourcing is a variable that appears as significantly negative, until we account for object type, turning into a significant positive. All nine cases of crowdsourced images are of 3D objects, not surprising as 3D has higher prevalence onsite while lower presence online (thus the need for crowdsourcing efforts such as Wiki Loves Art).

Object view also responds to characteristics of the Wikipedia articles. English is, as expected, the strongest positive language variable, followed by Indonesian and Dutch. This is not surprising as English is the largest Wikipedia edition, the NMWC museum is located in the Netherlands and a large part of the NMWC collection originates from Indonesia. Another determinant is the topic of the article. We divided the articles analysed based on topics defined by Spoerri (2007b) to include science (our baseline category), history, culture, sexuality and geography, the later exhibiting the strongest correlation coefficient by far. All other topics resulted positive though not significant associations.

The results above presented are not without shortcomings. First of all, the manual intensity of data gathering required (in spite of the tools available to automate part of the process) prevented us from working with a larger sample, as this exercise included a first try at the methodology. Nevertheless, and even with the data gaps and with the small size sample, results are strongly consistent. Future analysis could include a larger data set as well as the collections of multiple institutions. Our sample further included a few objects with exhibitions taking place at the moment of writing, for which onsite visitor numbers were not yet available. Still, given the wide longitudinal data collection period for visitors onsite, results are an indication of visibility for what have been the most popular objects in the last

century. Further, the number of views online per object does not account for the positioning of the image within the article. From our sample, three objects are located at the top subject box, one object is located at the bottom category box (negligible), and other objects are located throughout the articles. We did not account for position as strong, mid of low visibility because we lacked the comparable evaluation data for the onsite exhibition, which present similar dynamics depending on object positioning. Nonetheless, the onsite comparison to the online environment gives a number of clues on the consumer preference for heritage online.

5.6 DISCUSSION

The long tail refers to the uneven popularity of goods in a given market, cultural and heritage content making the tail longer (Ongena et al., 2012). The content from the NMWC can benefit from tapping into niche markets in order to reach a wider audience. The online distribution channel has proven key to position the content into niche markets (Benghozi and Benhamou, 2010), which can clearly be confirmed when comparing the average monthly views to the Tropenmuseum collection in the last two years: 50,000 views at the museum website compared to over 11 million views at the various Wikipedia articles. The museum not only benefits from the infrastructure in place, which is being developed to grow mobile, but also from the community of users who keep the content updated, what Benghozi and Benhamou (2010) refer to as information curation, and who increase the chance of reuse (Zhang and Kamps, 2010). Clearly, all are benefits for the museum at a marginal cost. For heritage institutions it is to be expected that using existing social online networks to disseminate content is less costly than developing their own online environments, this in terms of the resources needed to develop and maintain the technical platform as well as the community of users, as proposed by Benghozi and Benhamou (2010) and by Ongena et al., (2012). Further, the Wikipedia environment offers multilingual layers of access to content where the same object may be used in similar articles in different languages. In turn, Wikipedia benefits from having a larger repository of images to illustrate articles and hence enrich their quality by increasing diversity, an important characteristic valued by consumers (Ranaivoson, 2012). Ideally, collaboration would involve more than *image dumping* but also include enrichment of articles by staff at heritage institutions.

When we analysed the access to the NMWC collection, from the perspective of object mobility, we found that over 90% of objects have not been exhibited in physical spaces while almost 2% of collections have been exhibited two to ten times. The highest number of exhibitions is ten. Object mobility in an online environment show a slight thicker and longer tail, where 12% of objects available in Wikimedia are being used in Wikipedia articles, where one object has been recorded to be in 135 different Wikipedia articles at one time. Whereas Brynjolfsson et al. (2011) found an onsite long tail where 20% of objects account for 80% of the market to become longer online, we find a similar trend though with a different relationship. The Tropenmuseum collections onsite present a more acute relationship: 10% of collections account for 100% of onsite activity (exhibitions) while 12% of collections are used online. It is important to note that the collection available online accounts for only 1% of the physical collection. The expected longer and thicker online tail may grow as the entire collection of 600,000 objects is made available at the Wikimedia commons.

We also analysed access to the collections from the perspective of object visibility. We found a significant increase in object views when collections were also made available with a CC-BY-SA license (Creative Commons license Attribution Share alike) in the Wikimedia

repository. In the last century, 8.4 million people have visited the Tropenmuseum while 448.4 million people have visited Wikipedia pages containing images of the Tropenmuseum. That is an average of 94,500 visitors onsite per year increasing to 1.7 million visitors online per year. From the selected objects, the increase presented a different rate. Cumulatively, objects in our selection have received 15.5 million views onsite in the last century while objects online have received 5.7 million views in the last five years. This translates into an average of 2,223 views per onsite exhibit per year and 8,439 views per online article per year - a significant increase.

From the selection of most viewed objects onsite and online we can identify a clear difference in preference per object type: 3D is most popular in the onsite environment while the online environment prefers the use of 2D. This may be due to the strong tradition of exhibiting 3D objects in a physical setting (and using images as illustrations) and due to the limitations in the current available online technology to manipulate 3D content.[35] In contrast, images are the most viewed objects online.[36] It can be expected that acceptance and wide use of 3D digital imaging may still take some time.

In terms of the information signals to support selection of quality products, a striking difference is found between the onsite and the online environments. While experts (curators) select objects for physical exhibitions, it is the consumers (community of Wikipedia users) that select objects to be included in the Wikipedia articles. The object selection process by experts (curators, conservators and marketing staff in the museum) has been recently described by Lord and Piacente (2014) who identify a research or a market approach to exhibition design. Object selection by consumers in the online environment presents two distinct forms: first, objects can be selected to be incorporated in a Wikipedia article by editors (active selection). For editors, objects made available with descriptive metadata, such as the name of the person or the place, as well as images of higher resolution and originating from heritage institutions (expertise centres) form part of the information signals available. Second, object selection can result from article views by readers (passive selection). Consumers viewing the content (not editing) respond to the ranking mechanisms observed by Ginsburgh and Ours (2003), in the form of featured images and articles, as well as to signals of quality, based on the length of the article and number of images from multiple sources. The high traffic to the Wikipedia site, in all languages across the globe, signal a general consumer preference based on the social recommendation network established by the Wikipedia community, as argued by Clement et al. (2007).

Consumer preference cannot be measured in terms of sales (price and quantity sold), as customary in empirical economic analysis, because heritage content in Wikipedia is available free of charge. For this, we have analysed the number of views to articles containing the NMWC collection. The expected school cycles are observed, with lower number of views during the summer and winter school recess, confirming results by Ratkiewicz et al. (2010b). We also find a discrepancy in the popularity of articles viewed, with a strong preference for the English version, and the articles edited, with a higher number of articles found in the Indonesian version. The disclosed difference in consumer activity (edits and views) is in line with the characterization of the overall Wikipedia traffic (Reinoso et al., 2012).

[35] Hologram technology may accelerate adoption of 3D imaging (https://en.wikipedia.org/wiki/Hatsune_Miku).
[36] Before 1980, the Tropenmuseum's photographic collection was not a part of the collection but of the reference library, and photographs were not valued as *real objects* but as illustration of objects and their use in context. Therefore, little is known of the photographs mobility and visibility before 2003, when the photo collection was registered in TMS (Beumer, 2008). Museums have worked with photographs since the late 1800s to illustrate 3D objects (e.g. paintings) yet it took many decades before photography was accepted as a medium in its own right. The first photography museum opened in the 1950s by the founder of Kodak (https://en.wikipedia.org/wiki/George_Eastman_House).

5.7 CONCLUSIONS

Heritage institutions are trusted with the collections of human memory and are in charge of ensuring its present and future access. Consumption of collections, however, presents an unbalanced pattern of preference where a few objects are often viewed, while the majority of collections remain obscure; this has been referred to as the long tail. The Internet has provided a new platform to distribute content that promises to increase a more balanced access to collections and helps to realise the RICHES objective of making cultural heritage more accessible to the general public.

We can conclude that institutions interested in increasing accessibility to collections, by widening object mobility and visibility, benefit from publishing collections online in platforms such as Wikipedia. Museums can further benefit from active networked communities that keep content updated, advance technological development, and further support the greater access to collections, such as the one found in the Wikipedia community. In turn, Wikipedia benefits from a greater selection of images to enrich articles and hence gain greater popularity as a quality information source online.

6. CONCLUSION

This report has presented the research conducted on the cultural heritage digital market in Europe. Economic analysis on the impact of taxation, public support and private contribution to the production, distribution and consumption of cultural heritage was conducted in three steps. Firstly, we examined the fiscal policy for cultural goods across the EU Member States over time, secondly, we studied the current market of digital heritage and its ability to fuel innovation, and finally, we looked at the global use of European heritage content online. What follows is a summary of the three levels of analysis, with method and key results, to close with a proposal to improve efficiency of cultural activities in the digital market.

The three-level analysis is innovative in that understanding of the impact of fiscal policies has been advanced through a unique historic approach comparing VAT rates, prices and consumption level per Member State. Further, results from the ENUMERATE survey have been thoroughly examined for the first time quantitatively, leading to unique insights. Lastly, a unique dataset harvested from the Internet has lead to a unique first-of-a-kind comparison of consumption of culture onsite and online to illuminate consumer preference in the growing digital market.

Results help draw future lines of research as well as attainable goals to improve efficiency of a European cultural heritage digital market.

6.1 RESULTS

We document standard and reduced fiscal rates for books and other cultural goods and services in the EU Member States since 1993. In an attempt to generate a quantitative indication on how fiscal rates are set, we estimate their correlation. The results, however, do not deliver any clear patterns, as if there was no systematic association between reduced rates for culture and the fundamental drivers of cultural consumption. We further estimate the relationship between VAT rates for books and book prices or household expenditure on books. We show that the exact relation is that a 1% decrease in the VAT rate results in a 2.7% increase in book expenditure. These results reinforce the theory of lower prices and increased consumption due to a reduced VAT rate. That is, the public responds to the final price of the cultural good and not to the tax, independently of the presence of a reduction from the general sales tax.

Using data from the European ENUMERATE project, we analyse the extent to which heritage organizations have adopted a digital work practice, reflected in the share of collections digitized and published online, as indication of their ability to innovate. We have analysed the digitisation of heritage collections across a large sample of European organizations from a macro, meso and micro perspective. Such analysis may serve to inform the needs of institutions (micro level) from specific domains (meso level) within a national policy (macro level).

We find that there is a gap between the macro environment and the heritage sector to foster innovation. While the macro trend to foster digitisation supports an independence of funds to satisfy an immediate market, micro determinants that enhance digitisation rely on structural funds to develop long-term strategies. We also find domain characteristics of behaviour that, if shared, could benefit the entire heritage sector. While museums have a large share of digitized collections, libraries have a higher online publication.

Though it is not possible to argue for causality, it is clear that online availability of information enhances literacy, reuse and innovation.

We therefore argue for a revision of the national and institutional approaches to digitisation where more attention is to be given to building a common infrastructure, across domains, from which all organizations can innovate. This requires sustainable funding to allow organizations to plan, to develop slack, and to hire or train skilled staff able to develop sustainable policies to guide a digital work practice. A higher dissemination of content would reap on the investment towards digitisation and would only enrich our information society. Heritage organizations are eager to serve a digital literacy demand.

The extent to which these external factors can be identified as direct cause of innovation is impossible to determine. Our limited dataset and analysis can only serve as indication of the current digital heritage environment. However, we do find strong correlations that indicate the presence of national environments that foster, or hinder, the innovation ability of heritage institutions.

We analysed the change in accessibility of collections after digitisation of collections at the NMWC by looking at the mobility and visibility of objects onsite and online. We used data from exhibitions at the NMWC for the last century (onsite) and compared it to data from Wikimedia from the last five years (online). We found that object accessibility greatly increased when collections were published on the Wikimedia repository to be used in Wikipedia articles. Mobility grew from 10% of the collection being exhibited onsite to 12% of the collection being used in Wikipedia articles. Visibility grew exponentially from 94,500 visitors onsite per year to 1.7 million visitors online per year. We further took a sample of objects that were both exhibited onsite and were available online and selected the 5 most popular objects onsite and online. We found that visibility of those objects grew from an average of 2,000 views per exhibit per year to 8,000 views per Wikipedia article per year.

We also analysed the changes in heritage consumption preference and found two distinct variants, perhaps due to the dynamics of object selection. From our sample of the ten most popular objects, we found that objects available for view at the museum exhibition halls were selected by experts (museum curators), presenting a strong preference for 3D objects. In contrast, object selection for Wikipedia articles was conducted by the Wikipedia community, presenting a strong preference for 2D objects. Consumption of Wikipedia articles further presented a preference for quality articles, including multiple images from different sources, about geography, and in the English language.

6.2 IMPACT

In our society, changes brought on by digital technology have a highly dynamic nature, as consumer behaviour responds to and influences the adoption of new forms of production, distribution and consumption of heritage. Many effects of newly adopted consumption patterns will be tangible in the long term, as future generations are able (or not) to ensure sustainable access to materials (e.g., Marty, 2008). One already visible change is the exponential growth in customer reach through the Internet (e.g., Bakhshi and Throsby, 2012). Due the improved availability of digital technology, there emerge also new areas of cultural heritage, such as video games (e.g., Borowiecki and Prieto-Rodriguez, 2015).

In this research, it is shown that fiscal policy can potentially support a cultural policy aimed at increasing and enhancing audience reach. It is hoped that this will be increasingly recognized by European policy makers, especially nowadays at the onset of the age of digitisation, where right and efficient decisions may have significant consequences for future developments.

From our analysis conducted in section 4, we have identified multiple future questions. We were not able to find a relationship between the wealth of a country (GDP per capita) and the level of digital output, a more detailed analysis could consider the size of the heritage budget or endowments available per country. Another research dimension could further explore innovation in urban areas, where a higher concentration of innovation and creativity is expected, or the age of the institution, where younger organizations are expected to innovate more. Our results rely on a macro approach as the ENUMERATE data does not provide what type of agglomeration the institution is located in, neither it lists whether other institutions are located in proximity, enabling so potentially learning effects. Equally, since heritage institutions are generally long standing organizations, their age has not been captured. Further, applying our macro, meso and micro approach to analyse the innovation potential in other industries may refine understanding of the heritage sector. It can be expected that the current conditions are conductive towards innovation in other sectors, reflecting the distinct characteristics of the heritage sector.

Equally, research in understanding digital heritage consumer preference is extremely limited. Future lines of research using the Wikipedia environment include a comparison between museum types (e.g. science, art and history), between heritage organizations (e.g. archives, libraries, museums), between objet types (e.g. text, image, video), and between countries of origin (from collections and from viewers). Another line of research involves the analysis of costs related to participating in an open online environment, to identify the impact of the Wikipedian in Residence, for instance.

7. REFERENCES

Acs, Zoltan and David Audretsch (2005) 'Entrepreneurship and innovation' prepared for the 2005 Summer Institute of the Entrepreneurship, Growth and Public Policy Division of the Max Planck Institute of Economics. May 2005.

Acs, Zoltan, Pontus Braunerhjelm, David Audretsch, and Bo Carlsson (2009) 'The knowledge spillover theory of entrepreneurship' in *Small Business Economics*. 32(1):15-30.

Adler, Thomas et al. (2008) 'Assigning Trust to Wikipedia Content' in *Proceedings WikiSym*.

Ashworth, John, Bruno Heyndels, Kristien Werck (2010) 'Expert judgements and the demand for novels in Flanders' in *Journal of Cultural Economics*. 34(3):197-218.

Baca, Murtha (2013) 'The Public Catalogue Foundation's Your Paintings Project' in *Visual Resources: An International Journal of Documentation*. 29(3):151-153.

Bakhshi, Hasan and David Throsby (2014) 'Digital complements or substitutes? A quasi-field experiment from the Royal National Theatre' in *Journal of Cultural Economics*. 38(1):1-8.

Bakhshi, Hasan and David Throsby (2012) 'New Technologies in cultural institutions: theory, evidence and policy implications' in *International Journal of Cultural Policy*. 18(2):205-222.

Barata, Kimberly (2004) 'Archives in the digital age' in *Journal of the Society of Archivists*. 25(1):63-70.

Barrell, Ray and Martin Weale (2009) 'The Economics of a Reduction in VAT' in *Fiscal Studies*. 30(1):17-30.

Baumol, William (1968) 'Entrepreneurship in economic theory' in *American Economic Review*. 58(2):64-71.

Belastingdienst (2014) Tarieven en vrijstellingen. Available at http://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/zakelijk/btw/tarieven_en_vrijstellingen/ (accessed 24 September 2014).

Benghozi, Pierre-Jean, and Francoise Benhamou (2010) 'The Long Tail: Myth or Reality?' in *International Journal of Arts Management*. 12(3):43-53.

Benhamou, Francoise (2015) 'Fair use and fair competition for digitized cultural goods: the case of eBooks' in *Journal of Cultural Economics*. Published online 4 March 2015.

Beramendi, Pablo and David Rueda (2007) 'Social Democracy Constrained: Indirect Taxation in Industrialized Democracies' in *British Journal of Political Science*. 37(4):619-641.

Beumer, Marjolein (2008) *Capturing museum knowledge. A twenty year evolution in digitally recording the Tropenmuseum collection*. Bulleting 368. Amsterdam: KIT Publishers.

Berger, Jonah, Alan Sorensen, and Scott Rasmussen (2010) 'Positive Effects of Negative Publicity: When Negative Reviews Increase Sales' in *Marketing Science*. 29(5):815-827.

Blundell, Richard (2009) 'Assessing the Temporary VAT Cut Policy in the UK' in *Fiscal Studies*, 30(1):31-38.

Borowiecki, Karol J. (2015) 'History Matters: The Origins of Cultural Supply in Italy' in *Oxford Economic Papers*, 2015, 67(3): 781-805.

Borowiecki, Karol J. (2013) 'Geographic clustering and productivity: an instrumental variable approach for classical composers' in *Journal of Urban Economics*. 73(1):94-110.

Borowiecki, Karol J. and Juan Prieto-Rodriguez (2015) 'Video Games Playing: A substitute for cultural consumptions? in *Journal of Cultural Economics, 39(3): 239-58.*

Borowiecki, Karol J. and Trilce Navarrete (2015) 'Fiscal and Economic Aspects of Book Consumption in the European Union' in *ACEI Working Paper*. AWP-2-2015.

Borselli, Fabrizio, Salvatore Chiri and Ettore Romagnano (2012) 'Patterns of Reduced VAT Rates in the European Union' in *International VAT Monitor*. January/February 2012, pp. 13-21.

Brinkerink, Maarten (2015) 'Dutch Cultural Heritage Reaches Millions Every Month' in *Research & Development Blog*. 17 June 2015. Available at http://www.beeldengeluid.nl/en/blogs/research-amp-development-en/201506/dutch-cultural-heritage-reaches-millions-every-month.

Brokerhof, Agnes W. (2006) 'Collection Risk Management – The Next Frontier' in *CMA Cultural Property Protection*. Conference proceedings, Ottowa: CMA.

Brynjolfsson, Erik, Yu Hu, Duncan Simester (2011) 'Goodbye Pareto Principle, Hello Long Tail: The Effect of Search Costs on the Concentration of Product Sales' in *Management Science*. 57(8):1373-1386.

Camarero, Carmen, Ma. Jose Garrido and Eva Vicente (2011) 'How cultural organizations' size and funding influence innovation and performance: the case of museums' in *Journal of Cultural Economics*. 35(4):247-266.

Campbell, Lisa (2013) 'EU lines up e-book VAT debate' in *The Bookseller*. Published 21 October 2013. Available at http://www.thebookseller.com/news/eu-lines-e-book-vat-debate.

Canoy, Marcel, Jan C. van Ours and Frederick van der Ploeg (2006) 'The Economics of Books' in Victor Ginsburgh, and David Throsby (eds.) *Handbook of the Economics of Art and Culture*. Amsterdam: Elsevier BV, pp. 721-761.

Carbonnier, Clement (2005) 'Is Tax Shifting Asymmetric? Evidence from the French VAT reforms, 1995-2000' in *PSE Working Papers*. N2005-34.

Castañer, Xavier (2014) 'Cultural Innovation by Cultural Organizations' in Ginsburgh, Victor and David Throsby (eds.) *Handbook of Economics of Art and Culture*. North-Holland: Elsevier, pp.263-276.

Castañer, Xavier and Lorenzo Campos (2002) 'The Determinants of Artistic Innovation: Bringing in the Role of Organizations' in *Journal of Cultural Economics*. 26(1):29-52.

CE (Copenhagen Economics) (2007) *Study on reduced VAT applied to goods and services in the member states of the European Union. Final Report*. 21 June 2007. Denmark.

Chan, Ho Fai, Bruno Frey, Jana Gallus and Benno Torgler (2014) 'Academic honors and performance' in *Labour Economics*. 31:188-204.

Charlet, Alain and Jeffrey Owens (2010) 'An International Perspective on VAT' in *Tax Notes International*. 59(12):943-954.

Chevalier, Judith and Dina Mayzlin (2006) 'The Effect of Word of Mouth on Sales: Online Book Reviews' in *Journal of Marketing Research*. 43(3):345-354.

Clement, Michel, Dennis Proppe and Armin Rott (2007) 'Do Critics Make Bestsellers? Opinion Leaders and the Success of Books' in *Journal of Media Economics*. 20(2):77-105.

Colbjørnsen, Terje (2014) 'What is the VAT? The policies and practices of value added tax on ebooks in Europe' in *International Journal of Cultural Policy*. Published online 7 April 2014.

Compendium (2015) *Price Levels on Cultural Goods and Services (2003-2013)*. Consulted on January 2015 from http://www.culturalpolicies.net/web/statistics-markets.php.

Connaway, Lynn, et al. (2011) '"If it is too inconvenient I'm not going after it:" Convenience as a critical factor in information-seeking behaviours' in *Library & Information Science Research*. 33(3):179-190.

Crossley, Thomas, Hamish Low and Matthew Wakefield (2009) 'The Economics of a Temporary VAT Cut' in *Fiscal Studies*. 30(1):3-16.

Dallongeville, Jean et al. (2010) 'Increasing fruit and vegetable consumption: a cost-effectiveness analysis of public policies' in *European Journal of Public Health*. 21(1):69-73.

Damanpour, Fariborz (1987) 'The Adoption of Technological, Administrative, and Ancillary Innovations: Impact of Organizational Factors' in *Journal of Management*. 13(4):675-688.

Dimaggio, Paul and Kristen Stenberg (1985) 'Why do some theatres innovate more than others? An empirical analysis' in *Poetics*. 14(1-2):107-122.

Doerbecker, Carl (1973) *Museumbezoekers en de Derde Wereld: houdingsbeinvloeding ten aanzien van de Derde Wereld door museumbezoek en enkele kenmerken van bezoekers van het Tropenmuseum*. Amsterdam: KIT.

Dopfer, Kurt (2012) 'The origins of meso economics. Schumpeter's legacy and beyond' in *Journal of Evolutionary Economics*. 22(1):130-160.

Ell, Paul and Lorna Hughes (2013) 'E-Infrastructure in the Humanities' in *International Journal of Humanities and Arts Computing*. 7(1-2):24-40.

European Commission Taxation and Customs Union (1993-2015) *VAT Rates Applied in the Member States of the European Union*. Brussels. Ref. taxud.c.1(1993-2015)134284.5_3_RICHES Deliverable.docx

EC, European Commission (2006) *Council Directive 2006/112/EC* of 28 November 2006 *on the common system of value added tax*. L347/1.

EC, European Commission (2013) *Summary Report of The Outcome of the Public Consultation on the Review of Existing Legislation on VAT Reduced Rates*. Brussels. Ref. Ares(2013)685959-12/04/2013.

EC (2014) *Report of the Commission Expert Group on Taxation of the Digital Economy*. Taxation and Customs Union. Brussels: EC.

ENUMERATE (2014) 'ENUMERATE Core Survey 2 (2014) full dataset'. Accessed on 7 December 2014 at http://enumeratedataplatform.digibis.com/.

Eurostat (2011) *Cultural Statistics Pocketbook*. Luxembourg: Publications Office of the European Union.

Eurostat (2014) *Taxation trends in the European Union*. Consulted in November 2014 from http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2014/report.pdf.

Eurostat (2015) *Community Survey on ICT usage in households and by individuals*. Consulted in November 2014 from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ci_in_h&lang=en.

Feld, Alan, Michael O'Hare and Mark Schuster (1983) *Patrons Despite Themselves: Taxpayers and Tax Policy*. New York: New York University Press.

Franssen, Thomas and Olav Velthuis (2014) 'Making materiality matter: a sociological analysis of prices on the Dutch fiction book market, 1980-2009' in *Socio-Economic Review*. Published online 8 August 2014, pp. 1-24.

Frey, Bruno (2008) 'Cities, Culture and Happiness' in *ETHOS, World Cities Summit Issue*. June 2008, pp. 102-111.

Gesko, Martin (2013) 'Factors influencing the microeconomic and fiscal effects of the reduced VAT on books' in *European Financial Systems 2013. Proceedings of the 10th International Scientific Conference*. Brno: Masaryk University, pp. 99-106. Available at http://is.muni.cz/do/econ/soubory/konference/efs/Sbornik_2013.pdf.

Ginsburgh, Victor and Jan van Ours (2003) 'Expert opinion and compensation: evidence from a musical competition' in *American Economic Review*. 93(1):289-296.

Heilbrun, James (2001) 'Empirical Evidence of a Decline in Repertory Diversity among American Opera Companies 1991/92 to 1997/98' in *Journal of Cultural Economics*. 25(1):63-72.

Hemels, Sigrid (2013) 'Belastingen als middel voor kunstbeleid' in *Liberaal Reveil*. 2013(October):1-8.

Hemels, Sigrid (2009) "Influence of Different Purposes of Value Added Tax and Personal Income Tax on an Effective and Efficient Use of Tax Incentives: Taking Tax Incentives for the Arts and Culture as an Example" in Michael Lang, Peter Melz and Eleonor Kristoffersson, (eds.) *Value Added Tax and Direct Taxation. Similarities and Differences*. Amsterdam: IBFD.

Hemels, Sigrid (2008) 'Belastingwet stimuleert de kunst' in *Boekman*. 76(20):40-44.

Hemels, Sigrid (2007) 'Papieren BTW-tijger op de elektronische snelweg' in *Nederlands Tijdschrijft voor Fiscaal Recht*. 8(6):1-5.

Hemels, Sigrid (2005) *Door de muze omhelsd. Een onderzoek naar de inzet van belastingsubsidies voor kunst en cultuur in Nederland*. Nijmegen: Wolf Legal Publishers.

Hjorth-Andersen, Christian (2000) 'A model of the Danish book market' in *Journal of Cultural Economics*. 24(1):27-43.

Horsman, Peter (1999) 'Archiefsystemen en kwaliteit' in Horsman, Peter, Eric Ketelaar and Theo Thomassen (eds.) *Naar een paradigma in de archivistiek*. Jaarboek 1999. 's-Gravenhage: Stichting Archiefpublicaties, pp.85-105.

ITU (International Telecommunications Union) (2014) *Measuring the Information Society Report*. Geneva: ITU.

Jancic, Maja Bogataj, et al. (2015) *LAPSI Policy Recommendation N.5 The Proposed Inclusion of Cultural and Research Institutions in the Scope of PSI Directive*. Brussels: EC.

Jullien, Nicolas (2012) 'What we know about Wikipedia: A Review of the Literature Analyzing the Project(s)' research paper available at SSRN: http://papers.ssrn.com/abstract=2053597.

Keefer, Philip (2012) *DPI2010. Database of Political Institutions: Changes and Variable Definitions*. Development Research Group, World Bank.

Klitgaard, Michael and Christian Elmelund-Praestekaer (2014) 'The partisanship of systemic retrenchment: tax policy and welfare reform in Denmark 1975-2008' in *European Political Science Review*. 6(1):1-9.

Krashen, Stephen, Syying Lee and Jeff McQuillan (2012) 'Is the Library Important? Multivariate Studies at the National and International Level' in *Journal of Language and Literacy Education*. 8(1):26-38.

Lee, Neil and Andres Rodriguez-Pose (2014) 'Innovation in Creative Cities: Evidence from British Small Firms' in *Industry and Innovation*. 21(6):494-512.

Lehmann, Janette et al. (2014) 'Reader Preferences and Behaviour on Wikipedia' in *HT'14 Proceedings of the 25th ACM conference on Hypertext and social media*. ACM, New York, pp.88-97.

Lehmann, Jens et al. (2015) 'DBpedia – A Large-scale, Multilingual Knowledge Base Extracted from Wikipedia' in *Semantic Web*. 6(2):167-195.

Linklater, Emma (2014) 'Neutrality of VAT Rates Under European Law: All Books are Created Equal, but Some are More Equal than Others?' in *Publishing Research Quarterly*. 20(3):300-312.

Lomas, Ulrika (2010) 'German Hoteliers Fail To Pass On VAT Reduction' in *Law and Tax News*. Available at http://www.lawandtax-news.com/asp/German_Hoteliers_Fail_To_Pass_On_VAT_Reduction_41129.html

Loran, Margarida (2005) 'Use of Websites to Increase Access and Develop Audiences in Museums: Experiences in British National Museums' in *Digithum*. No.7. Consulted on 1 March 2015 from http://www.uoc.edu/digithum/7/dt/eng/loran.pdf.

Lord, Barry and Maria Piacente (2014) *Manual of Museum Exhibitions*. UK: Rowmans and Littlefield.

Mackenzie Owen, John (2007) *The scientific article in the age of digitisation*. Dordrecht: Springer.

Malerba, Franco and Luigi Orsenigo (1995) 'Schumpeterian patterns of innovation' in *Cambridge Journal of Economics*. 19(1):47-65.

Marty, Paul (2008a) 'Changing Needs and Expectations' in Paul Marty and Burton Jones (eds.) *Museum Informatics, People, Information and Technology in Museums*. New York: Routledge, pp. 181-186.

Marty, Paul (2008b) 'Museum websites and museum visitors: digital museum resources and their use' in *Museum Management and Curatorship*. 23(1):81-99.

Mestyan, Marton, Taha Yasseri and Janos Kertesz (2013) 'Early Prediction of movie Box Office Success Based on Wikipedia Activity Big Data' in *PLOS ONE*. 8(8):1-8.

MvF (Ministerie van Financien) (2014) *Evaluatie verhoging btw-tarief podiumhunsten*. Letter AFP/2014/289 with annex. The Hague.

Navarrete, Trilce (2013) 'Digital Cultural Heritage' in Rizzo and Mignosa (eds.) *Handbook on the Economics of Cultural Heritage*. Cheltenham: Edward Elgar, pp. 251-271.

Navarrete, Trilce (2014a) *A History of Digitisation: Dutch Museums*. PhD dissertation. University of Amsterdam.

Navarrete, Trilce (2014b) 'Becoming Digital: A Dutch Heritage Perspective' in *Journal of Arts and Management, Law and Society*. 44(3):153-168.

Navarrete, Trilce (2015) 'Benefits of collaborative digitisation projects in Europe' in *Les Cahiers du numerique*. 11(1):41-56.

Navarrete, Trilce and Karol J. Borowiecki (2015) 'Change in access after digitisation: ethnographic collections in Wikipedia' in *ACEI Working Paper*. AWP-2015.

Nelson, Robert, Michael Donihue, Donald Waldman and William Wheaton (2007) 'What's an Oscar worth?' in *Economic Inquiry*. 39(1):1-6.

O'Hagan, John (2012) 'Tax Expenditures: Pervasive, 'Hidden' and Undesirable Subsidies to the Arts?' in *Homo Oeconomicus*, 29(2):95-118.

O'Hagan, John (2003) 'Tax concessions' in Ruth Towse (ed.) *A Handbook of Cultural Economics*. Cheltenham: Edward Elgar.

O'Hagan, John (1998) *The State and the Arts: An Analysis of Key Economic Policy Issues in Europe and the United States*. Cheltenham: Edward Elgar.

Okoli, Chitu et al. (2012) 'The people's encyclopedia under the gaze of the sages: A systematic review of scholarly research on Wikipedia'. SSRN Scholarly Paper, available at http://papers.ssrn.com/abstract=2021326.

Ongena, Guido, Erik Huizer and Lidwien van de Wijngaert (2012) 'Threats and opportunities for new audiovidual cultural heritage archive services: the Dutch case' in *Telematics and Informatics*. 29(2):156-165.

Peltier, Stephanie and Francois Moreau (2012) 'Internet and the 'Long Tail versus superstar effect' debate: evidence from the French book market' in *Applied Economic Letters*. 19(8):711-715.

Pierce, Lamar (2000) 'Programmatic Risk-Taking by American Opera Companies' in *Journal of Cultural Economics*. 24(1):45-63.

Plaza, Beatriz (2000) 'Evaluating the Influence of a Large Cultural Artifact in the Attraction of Tourism. The Guggenheim Museum Bilbao Case' in *Urban Affairs Review*. 36(2):264-274.

Potts, Jason, Stuart Cunningham, John Hartley, Paul Ormerod (2008) 'Social network markets: a new definition of the creative industries' in *Journal of Cultural Economics*. 32(3):167-185.

Ponzo, Michaela and Vincenzo Scoppa (2015) 'Experts' awards and economic success: evidence from an Italian literary prize' in *Journal of Cultural Economics*. Published online 5 January 2015.

Prieto-Rodriguez, Juan, Desiderio Romero-Jordan and Jose Felix Sanz-Sanz (2005) 'Is a Tax Cut on Cultural Goods Consumption Actually Desirable? A Microsimulation Analysis applied to Spain' in *Fiscal Studies*. 26(4):549-576.

Ranaivoson, Heritiana, Does the Consumer Value Diversity? How the Economists' Standard Hypothesis is Being Challenged (December 14, 2012). in Vecco M. (Ed.), The Consumption of Culture, The Culture of Consumption. A Collection of Contributions on Cultural Consumption and Cultural Markets, Lambert Academic Publishing, p.70-95.

Ratkiewicz, Jacob, Santo Fortunato, Alessandro Flammini, Filippo Menczer, and Alessandro Vespignani (2010a) 'Characterizing and Modelling the Dynamics of Online Popularity' in *Physical Review Letters*. 105(15):1-4.

Ratkiewicz, Jacob, F. Menczer, S. Fortunato, A. Flammini and A. Vespignani (2010b) 'Traffic in Social Media II: Modeling Bursty Popularity' in *IEEE International Conference on Social Computing*.

Reinoso, Antonio, Israel Herraiz, Rocio Muñoz-Mansilla, Felipe Ortega (2012) 'Characterization of the Wikipedia Traffic' in *ICIW 2012: Seventh International Conference on Internet and Web Applications and Services*. IARIA, 2012, pp. 156-162.

Ringstad, Vidar and Knut Løyland (2006) 'The demand for books estimated by means of consumer survey data' in *Journal of Cultural Economics*. 30(2):141-155.

Rosner, Martin (1968) 'Economic Determinants of Organizational Innovation' in *Administrative Science Quarterly*. 12(4):614-625.

Saracevic, Tefko (2000) 'Digital library evaluation: Toward evolution of concepts' in *Library Trends*. 49(2):350-369.

Schumpeter, Joseph A. (1942) *Capitalism, socialism and democracy*. New York: Harper & Brothers.

Schumpeter, Joseph A. (1947) 'The Creative Response in Economic History' in *Journal of Economic History*. 7(2):149-159.

Schuster, Mark (2006) 'Tax Incentives in Cultural Policy' in in Victor Ginsburgh, and David Throsby (eds.), *Handbook of the Economics of Art and Culture*. Elsevier BV: Amsterdam, pp. 1253-1298.

Seaman, Bruce (2006) 'Empirical Studies of Demand for the Performing Arts' in Victor Ginsburgh and David Throsby (eds.) *Handbook of the Economics of Art and Culture*. Elsevier BV: Amsterdam, pp. 415-472.

Skov, Mette and Peter Ingwersen (2008) 'Exploring information seeking behaviour in a digital museum context' in *IIiX '08 Proceedings of the second international symposium on Information interaction in context*. New York: ACM, pp. 110-115.

Skov, Mette and Peter Ingwersen (2014) 'Museum Web Search behaviour of special interest visitors' in *Library & Information Science Research*. 36(2):91-98.

Sorensen, Alan (2007) 'Bestseller lists and product variety' in *The Journal of Industrial Economics*. 55(4):715-738.

Spoerri, Anselm (2007a) 'Visualizing the Overlap between the 100 Most Visited Pages on Wikipedia for September 2006 to January 2007' in *First Monday*. 12(4):1-6.

Spoerri, Anselm (2007b) 'What is popular on Wikipedia and why?' in *First Monday*. 12(4):1-15.

Statistics Netherlands (2015) *Consumentenprijzen; prijsindex 2006 = 100*. Available from statline.cbs.nl.

Stroeker, Natascha and Rene Vogels (2014) *Survey Report on Digitisation in European Cultural Heriaga Institutions 2014*. Zoetermeer: Panteia.

Vakervisser, Cornelia and Els van der Zee (1963) *Het Tropenmuseum en zijn publiek: een onderzoek naar de samenstelling van het publiek en naar zijn mening, houding en gedrag ter aanzien van het museum*. Amsterdam: KIT.

Verhoeven, Deb (2012) 'New cinema history and the computational turn' in *WCCA 2012*, *World Congress of Communication and the Arts Conference Proceedings*. COPEC, Science and Education Research Council. Accessed on 5 March 2015 at http://dro.deakin.edu.au/view/DU:30044939.

Walls, David (2010) 'Superstars and heavy tails in recorded entertainment: empirical analysis of the market for DVDs' in *Journal of Cultural Economics*. 34(4):261-279.

Zavisca, Jane (2005) 'The Status of Cultural Omnivorism: A Case Study of Reading in Russia' in *Social Forces*. 84(2):1233-1255.

Yakel, Elizabeth (2004) 'Seeking information, seeking connections, seeking meaning: genealogists and family historians' in *Information Research*. 10(1). Paper 205.

Zhang, Junte and Jaap Kamps (2010a) 'A Search Log-Based Approach to Evaluation' in M. Lalmas et al. (eds.) *Research and Advanced Technology for Digital Libraries*, LNCS 6273, pp. 248-260. Berlin: Springer.

Zhang, Junte and Jaap Kamps (2010b) 'Search Log Analysis of user Stereotypes, Information Seeking Behaviour, and Contextual Evaluation' in *IIiX '10 Proceedings of the third symposium on information interaction in context*. New York: ACM. Pp. 245-254.

APPENDIX: SUPPLEMENTARY MATERIAL

Appendix 2.1 VAT Directive in the European Union

VAT was first introduced in France in 1954, and by 1967 the European Union established a VAT system, which became a prerequisite for membership. Over 80 countries have adopted the VAT system (CE, 2007), including all OECD countries, except for the United States where most states raise revenue through a sales tax. Before the VAT system was established, governments used the retail sales tax to raise revenue (Charlet and Owens, 2010). The VAT system is favoured over a sales tax because it reduces fraud, it does not reduce the incentives to save or invest and it allows setting various rates of taxation to different goods and services (CE, 2007). VAT is a tax defined not by the individual's ability to pay, as is the personal income tax, but on her ability to consume.

VAT rates are harmonised across EU Member States through a set of guidelines defined in the European Commission's Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (OJ 2006 L 347, p.1), as amended by Council Directive 2010/88EU of 7 December 2010 (OJ 2010 L 326, p.1). Annex III to that directive contains a list of the goods and services that may receive a reduced rate and annex IX contains a list specific to works of art. Point 6 of Annex III to the VAT Directive includes the supply of books "on all physical means of support" while article 7(1) and (2) of Implementing Regulation No 282/2011 excludes "electronically supplied services" (e.g. e-books). That is, the VAT rate is established based on the carrier and not on the content, resulting in a negative incentive for technologic development in Europe. "The current VAT regime [translates in] a competition advantage for printed" materials (Hemels, 2009:14).

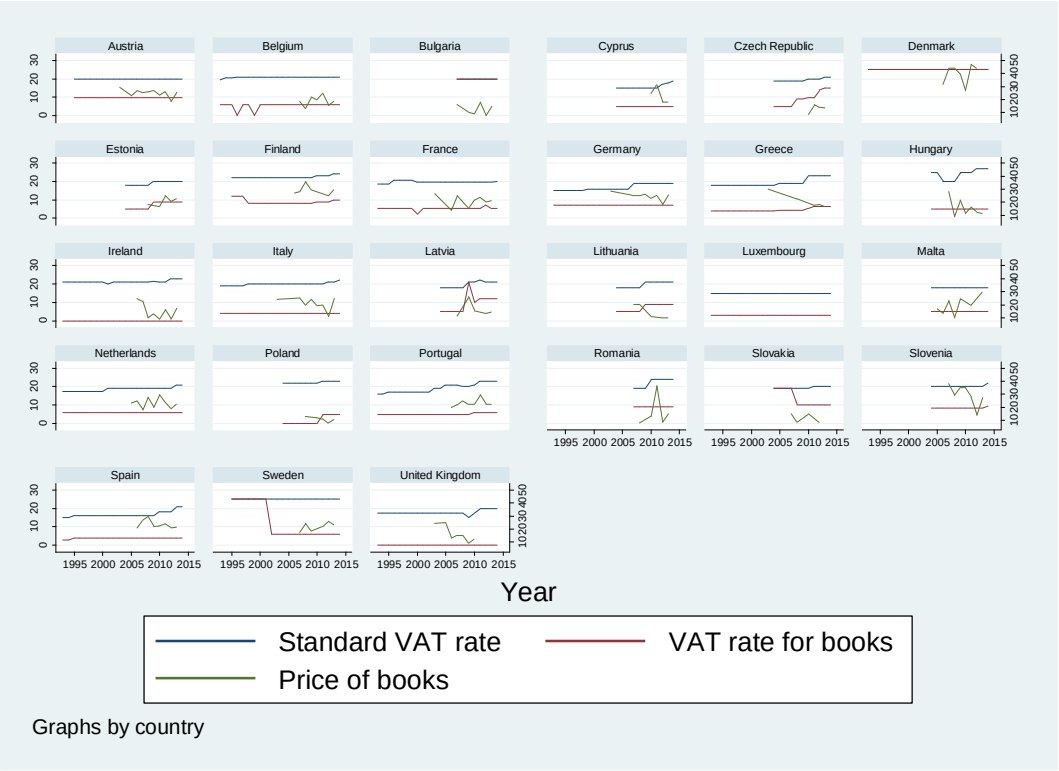
The VAT Directive states that the minimum standard rate may not be less than 15%; reduced rates should not be less than 5%; some EU Member States may maintain a super reduced rate that is lower than 5% (EC, 2006), and in other cases goods may have a VAT exemption all together. EU Member States decide whether a VAT reduced rate is allocated to goods and services, from the list in Annex III and IX of the VAT Directive. The nature of cultural goods and services has resulted too broad when defining VAT rates, as VAT rates only apply to goods and not to services and as such excludes things such as video art and commissioned work. Not all Member States have the same reduction on specific goods and services since VAT rates are part of a national tax policy and may function to complement the government financing system towards culture in different ways (Colbjørnsen, 2014). France and Luxembourg are two EU countries that introduced a reduced VAT rate also for e-books on 1 January 2012, at 5.5% and 3% respectively, without the Commission's approval. The Court of Justice of the European Union ruled on 5 March 2015 that e-books supplied via download or streaming to be a service and therefore fall outside of the VAT exemption. France and Luxemburg are required to comply with the VAT Directive.

The increased use of digital technology for the production, distribution and consumption of cultural goods and services has raised questions regarding the VAT Directive. Besides the distinction on carrier instead of content to define a VAT rate (as the case of e-books), the geographic location has proved important to determine the VAT rate, as fiscal policy is set within individual EU Member States. The Internet allows the producer, distributer and consumer to be located in different locations and therefore be regulated by different VAT rates, giving a market advantage to certain Internet-based suppliers (namely Luxemburg-based suppliers) (Campbell, 2013). On 1 January 2015, a change in the VAT

Directive was established to define taxation on the basis of the location of the end customer and not, as previously established, based on the location of the supplier.

Appendix 2.2 Overview of VAT rates by country, 1993-2013

Figure 2.A1. VAT rate for books and prices, by country



Appendix 2.3 Additional tables and figures

Table 2.A1. Robustness test: Determinants of VAT rates, EU 1993-2013

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Standard rate	Books	Newspapers	Periodicals	Admission to cultural services	TV license	Supplies by creators
Log (population)	-7.690***	-3.782	-4.987	-7.806	-8.858	38.13***	15.11
	(2.411)	(7.054)	(3.912)	(9.083)	(11.18)	(13.51)	(9.575)
GDP per capita	-0.0490***	-0.0316	0.0297	-0.0194	0.125	-0.101	-0.123
	(0.0170)	(0.0497)	(0.0275)	(0.0640)	(0.0787)	(0.0913)	(0.0746)
Share of mid or high educational attainment (15-64 ages)	0.0393**	0.136***	0.0166	0.111*	-0.291***	-0.130	-0.213***
	(0.0162)	(0.0473)	(0.0262)	(0.0609)	(0.0752)	(0.0849)	(0.0779)
Left-wing party orientation	-0.0983	0.359	0.259	0.602	-1.200**	0.117	1.039**
	(0.121)	(0.354)	(0.196)	(0.455)	(0.564)	(0.653)	(0.447)
Year FE	yes	yes	Yes	yes	yes	Yes	yes
Country FE	yes	yes	Yes	yes	yes	yes	yes
Observations	346	346	346	346	343	307	251
R-squared	0.924	0.860	0.912	0.817	0.728	0.792	0.856
Number of years	20	20	20	20	20	20	13

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 3.A: Characteristics of archives, libraries and museums

Archival collections are linked to government structures of information creation and provision undergoing a major transformation driven by e-government programs. The goal of e-government policies is to provide sustainable, transparent and trustworthy access to information services from the user's perspective (Barata, 2004; Yakel 2004). Legal measures, including the Freedom of Information Acts and Data Protection Acts, have been designed to further ensure transparent, authentic and secure access to information (Barata, 2004).

Recordkeeping systems strive to provide an absolute quality of products and services throughout the archival processes, which include activities related to capture, organization, description, selection, disposal, archiving and giving access to information (Horsman, 1999). These processes have gained complexity as archives by adopting a digital work practice to include digitized and born digital documents. Barata (2004) identify though a growing gap between governmental goals and institutional practice brought by an institutional inability to adopt a digital work practice that would satisfy the quality required.

Archival collections, and to a certain extent libraries, are increasingly used for tracing family history. Genealogists search for discrete facts and dates, which require a specific information service able to allow remote access of large collections of birth certificates, army registers or marriage contracts (Yakel, 2004). A number of genealogical societies and Internet sites have developed to respond to this specific consumer need because governmental archives are not always able to provide such specific searching service.

Digitisation of library collections, largely comprised of books that can be scanned, has generally taken place within universities and national libraries. Digitisation of books has had a particular trajectory after Google launched the mass digitisation program in 2004, the Google Library Project, which accounts by now for over 15 million digital books (Benhamou, 2015). Another related initiative is the Open-Access Text Archive project launched by the Internet Archive in 2007, responsible for scanning over 2.1 million books and for giving online access to over 6 million full-text books (https://archive.org/).

Technical innovation of digitisation in libraries has centred on giving optimal full-text search access to large collections of books across institutions by building networked infrastructures with improved usability and functionality (Saracevic, 2000). Increasingly, the notion of a digital library has grown to represent a collection of digital material independently of form or origin.

Museums have a long history of working with collection surrogates, or representations of objects, because of the difficulties brought by accessing, searching or manipulating the individual objects within large collections (Marty, 2007). Given the prominence of 3D objects in museum collections, the items are generally photographed rather than scanned. For example, the Google Art Project has made available over 45,000 objects in high resolution (gigapixel imaging). The buildings are also treated as objects and can be viewed in the Virtual Gallery Tour using Google's indoor street view technology, currently covering more than 60 museums. Digitisation in museums has benefited from technical innovation on imaging and 3D visualizations.

Appendix 3.B: Control variables

The following controls were established in order to isolate the effects of the independent variables:

Macro variables:

- Demographics: GDP, size of population, level of education, and personal use of the Internet.
- Region: Central (baseline), Nordic, West, British Isles, South, East, and South East. Regional controls are largely based on the United Nations statistical divisions for Europe with some additional disaggregation to enable a more detailed exploitation of the underlying database. We distinguish the following regions of Europe: Central (Austria, Germany, Liechtenstein, Switzerland), Nordic (Demark, Finland, Iceland, Sweden), British Isles (Ireland, United Kingdom), South (Cyprus, Greece, Italy, Malta, Portugal, Spain), East (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Slovakia) and South East (Slovenia, Bosnia and Herzegovina, Macedonia).
- Country: Austria, Belgium, Bosnia Herzegovina, Bulgaria, Check Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Monaco, Moldova, Poland, Portugal, Netherlands, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK (baseline).

Meso variables:

- Domain: archive, library, museum. Or type of institution (used in some robustness specifications): audio visual archive, film institute, higher education library, monument care, performing arts, history museum, art museum, ethnography museum, nature museum, science museum, national archive, national library, other archive, other type of institution, public library, or special library.

Micro variables:

- Digital publication: online publication on own website or any other platform.
- Policy: digitisation strategy, policy of use of digital collections, digitisation preservation strategy.
- Organization type: total budget, digital activities budget, FTE, specialized FTE.
- Funding source: internal funding, crowdfunding, national public, regional public, private fund, public/private partnerships, sales digital, and other.
- Domain: archive, library (baseline), and museum.
- Type of collection: audio visual archive, film institute, higher education library, monument care, performing arts, museum of art (baseline), museum of history, museum of ethnography, museum of nature, museum of science, national archive, national library, other archive, other type of institution, public library, and special library.
- Type of user: academic research, creative reuse, educational use, commemorative use, personal enjoyment, preservation, commercial, and other.

Appendix 3.C: Additional Tables

Table 3.C.1 Level of digitisation – Reporting all coefficients

VARIABLES	(1) Digitized baseline	(2) Digitized baseline plus ftedigital_share	(3) Digitized baseline plus fund sources	(4) Digitized baseline plus fund sources plus macro plus itu	(5) Digitized by country and type
digitisationstrategy	6.941***	6.275***	6.433***	6.673***	6.798***
	(1.595)	(1.771)	(1.827)	(1.839)	(2.073)
budget	5.205**	4.674**	4.402**	4.699**	4.667*
	(1.928)	(2.156)	(2.102)	(2.160)	(2.392)
budget_2	-0.670***	-0.628**	-0.577**	-0.627**	-0.653**
	(0.238)	(0.264)	(0.257)	(0.264)	(0.298)
fte	-0.000919	-0.00404***	-0.00416***	-0.00390***	-0.00337**
	(0.00252)	(0.000822)	(0.000846)	(0.000865)	(0.00131)
ftedigital_share		1.201	1.277	1.210	1.312
		(0.884)	(0.907)	(0.928)	(0.858)
t_audio_visual_archive					-10.91
					(8.774)
t_film_institute					-19.46***
					(7.048)
t_higher_educ_library					-22.36***
					(8.079)
t_monument_care					-20.07**
					(8.885)
t_performing_arts					-24.53*
					(13.35)
t_museum_history					-8.007
					(5.018)
t_museum_ethnography					-19.59***
					(6.702)
t_museum_nature					-14.10
					(10.80)
t_museum_science					-11.25
					(9.579)
t_national_archive					-27.72***
					(7.426)
t_national_library					-26.10***
					(7.588)
t_other_archive					-24.05**
					(9.159)
t_other_type_of_institution					-16.39**
					(7.584)
t_public_library					-18.46**
					(7.456)
t_special_library					-21.23**

	(7.805)
country_Austria	6.438***
	(1.642)
country_Belgium	1.622
	(1.296)
o.country_Bulgaria	-
country_Cyprus	19.18***
	(1.482)
country_Denmark	-2.891
	(2.317)
country_Estonia	-4.139***
	(1.205)
country_Finland	1.101
	(0.872)
country_France	-20.39***
	(3.705)
country_Germany	-3.090
	(2.164)
country_Greece	7.150***
	(2.488)
country_Hungary	-6.118***
	(1.580)
country_Iceland	-0.256
	(1.221)
country_Ireland	-3.123
	(3.021)
country_Italy	-1.892
	(1.669)
country_Latvia	4.257
	(2.906)
country_Liechtenstein	-8.607**
	(3.306)
country_Lithuania	-5.872***
	(1.074)
country_Luxembourg	13.23***
	(2.077)
country_Malta	21.57***
	(3.677)
country_Moldova	-10.47**
	(4.398)
country_Poland	1.677
	(1.935)
country_Netherlands	5.746***
	(1.188)
country_Romania	-3.321*
	(1.862)
country_Slovakia	-12.93***

					(3.319)
country_Slovenia					2.131*
					(1.226)
country_Spain					6.184***
					(1.323)
country_Sweden					-0.833
					(0.716)
country_Switzerland					-2.294
					(2.250)
country_BosniaHerz					-2.849
					(4.245)
country_Czech					-7.804***
					(1.533)
country_Macedonia					9.623**
					(4.616)
country_Portugal					-1.233
					(1.929)
s_archive	-1.091	-2.260	-2.224	-2.139	
	(2.249)	(2.441)	(2.224)	(2.229)	
s_museum	10.97***	11.54***	11.45***	11.45***	
	(2.238)	(2.754)	(2.680)	(2.755)	
s_other	8.776**	13.15***	13.49***	12.65***	
	(3.493)	(3.607)	(3.529)	(3.646)	
fund_internal			2.184	2.219	
			(1.415)	(1.475)	
fund_crowdfunding			-1.526	-1.912	
			(5.023)	(4.926)	
fund_nationalpublic			-0.578	-0.484	
			(1.526)	(1.577)	
fund_regionalpublic			0.129	0.617	
			(1.587)	(1.575)	
fund_privatefund			-1.127	-1.121	
			(1.335)	(1.351)	
fund_ppp			-1.866	-2.040	
			(2.827)	(2.867)	
fund_salesdigital			-1.593	-1.740	
			(3.899)	(3.953)	
fund_other			-1.825	-2.044	
			(2.483)	(2.461)	
gdp_pc				-3.61e-05	
				(7.72e-05)	
lpop				-1.689**	
				(0.661)	
educ_15_64_mid_high				0.259**	
				(0.120)	
itu				-0.0238	
				(0.145)	
Europe_Nordic	3.294	2.843	3.262	1.256	

	(2.216)	(2.290)	(2.271)	(3.454)	
Europe_West	8.460***	8.521***	8.533***	9.314***	
	(2.048)	(2.275)	(2.306)	(3.261)	
Europe_British_Isles	1.716	2.860	2.561	2.835	
	(1.992)	(2.078)	(2.308)	(2.698)	
Europe_South	6.770***	7.778***	7.895***	12.87**	
	(1.885)	(2.129)	(2.077)	(4.995)	
Europe_East	-2.453	-2.329	-2.270	-7.175	
	(1.923)	(2.371)	(2.466)	(4.387)	
Europe_South_East	4.163**	5.190**	5.101**	-1.274	
	(1.955)	(2.173)	(2.303)	(4.501)	
Constant	-1.046	1.556	0.320	12.28	25.99***
	(2.756)	(3.726)	(3.868)	(20.68)	(7.966)
Observations	1,085	721	721	717	721
R-squared	0.135	0.149	0.152	0.157	0.209

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.C.2 Robustness of the ENUMERATE sample

	(1)	(2)	(3)
	Baseline	Controlling for enumerate countries	Controlling for number of institutions per 1m citizen
VARIABLES	Digitized	Digitized	Digitized
enumerate		6.460**	
		(3.106)	
tot_inst_per_pop			-0.0149
			(0.0472)
digitisationstrategy	6.508***	6.721***	6.489***
	(1.784)	(1.761)	(1.802)
budget	5.024**	5.030**	5.032**
	(2.202)	(2.215)	(2.202)
budget_2	-0.685**	-0.680**	-0.687**
	(0.269)	(0.270)	(0.269)
fte	-0.00376***	-0.00380***	-0.00375***
	(0.000842)	(0.000880)	(0.000846)
ftedigital_share	1.138	1.194	1.137
	(0.896)	(0.915)	(0.896)
gdp_pc	-2.76e-05	9.53e-05	-3.52e-05
	(7.67e-05)	(7.08e-05)	(9.07e-05)
lpop	-1.646**	-2.483***	-1.780
	(0.710)	(0.822)	(1.074)
educ_15_64_mid_high	0.253**	0.305***	0.241
	(0.123)	(0.0779)	(0.145)
itu	-0.00650	-0.224	0.00466
	(0.163)	(0.165)	(0.179)
s_archive	-2.265	-2.194	-2.265
	(2.473)	(2.513)	(2.475)
s_museum	11.50***	11.36***	11.47***
	(2.828)	(2.810)	(2.823)
s_other	12.26***	11.80***	12.27***
	(3.749)	(3.774)	(3.753)
Europe_Nordic	0.710	6.779*	0.556
	(3.499)	(3.502)	(3.815)
Europe_West	9.153***	9.901***	8.859**
	(3.260)	(2.617)	(3.929)
Europe_British_Isles	3.139	5.210**	2.933
	(2.471)	(1.881)	(2.814)
Europe_South	12.99**	13.82***	12.68**
	(5.178)	(3.277)	(5.652)
Europe_East	-6.762	-3.739	-6.975
	(4.278)	(3.737)	(4.575)
Europe_South_East	-0.611	-4.582	-0.666
	(4.473)	(4.401)	(4.494)
Constant	11.63	29.64	14.36
	(21.58)	(19.21)	(27.22)
Observations	717	717	717
R-squared	0.154	0.157	0.154

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.C.3 Digitisation policy and digitisation of collections - Reporting all coefficients

VARIABLES	(1) Digitisation strategy	(2) Incidental cost	(3) Online publication
digitisationstrategy		1.368	4.029
		(2.340)	(3.324)
digitalpreservationstrategy	0.367***	-6.879**	
	(0.0559)	(2.684)	
policyuse	0.290***	-6.572**	
	(0.0517)	(2.680)	
digitized	0.00161**	-0.0494	0.305***
	(0.000607)	(0.0564)	(0.0622)
gdp_pc	-3.03e-06	0.000300**	-6.07e-05
	(2.70e-06)	(0.000109)	(0.000204)
lpop	0.000804	0.189	1.113
	(0.0150)	(0.614)	(1.384)
educ_15_64_mid_high	-0.00619**	0.148	-0.0793
	(0.00278)	(0.124)	(0.280)
itu	0.00450	0.102	0.541**
	(0.00267)	(0.185)	(0.248)
budget	0.00450	1.641	-3.350
	(0.0359)	(3.513)	(3.284)
budget_2	0.00290	-0.317	0.613
	(0.00444)	(0.394)	(0.387)
fte	3.32e-05	-0.000867	0.00522
	(5.56e-05)	(0.00219)	(0.00466)
ftedigital_share	0.0190*	-2.012**	-0.205
	(0.00939)	(0.759)	(0.522)
s_archive	-0.0494	-6.095*	-31.01***
	(0.0331)	(3.081)	(3.758)
s_museum	-0.0560	-7.901**	-42.33***
	(0.0380)	(3.402)	(3.986)
s_other	-0.0204	-3.879	-34.15***
	(0.0829)	(6.485)	(8.111)
fund_internal	0.0530	3.927	7.351
	(0.0564)	(5.562)	(4.463)
fund_crowdfunding	0.134*	3.683	-2.680
	(0.0701)	(5.731)	(11.18)
fund_nationalpublic	-0.0413	4.394	4.631
	(0.0277)	(2.919)	(2.752)
fund_regionalpublic	-0.0145	-1.441	-0.330
	(0.0488)	(2.205)	(3.913)
fund_privatefund	0.0529	2.819	5.787
	(0.0585)	(3.628)	(4.654)
fund_ppp	-0.0812	0.306	-6.457*
	(0.0500)	(2.411)	(3.540)

fund_salesdigital	0.0217	8.851**	-0.338
	(0.0440)	(3.968)	(3.830)
fund_other	0.0133	9.196	4.591
	(0.0413)	(5.910)	(4.396)
Europe_Nordic	-0.0720	9.489*	12.14
	(0.0810)	(5.278)	(9.079)
Europe_West	0.186***	-2.935	13.70**
	(0.0657)	(4.143)	(5.752)
Europe_British_Isles	-0.143***	2.731	3.336
	(0.0497)	(2.854)	(3.193)
Europe_South	-0.0219	9.497**	23.38***
	(0.0792)	(4.152)	(6.749)
Europe_East	0.107	13.86***	21.62**
	(0.0778)	(4.451)	(8.212)
Europe_South_East	-0.00780	14.42***	18.15**
	(0.0690)	(4.723)	(8.396)
Constant	0.248	20.49	-13.25
	(0.389)	(20.78)	(29.46)
Observations	668	668	630
R-squared	0.395	0.087	0.277

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3.C.4 Users of digital heritage collections - Reporting all coefficients

VARIABLES	(1) Academic research	(2) Creative reuse	(3) Educational use	(4) Commemorative	(5) Personal enjoyment	(6) Preservation	(7) Commercial	(8) Other Use
Digitisationstrategy	0.453***	0.552*	0.200	0.252	0.228	0.245	0.0156	0.773***
	(0.126)	(0.281)	(0.179)	(0.412)	(0.199)	(0.189)	(0.176)	(0.277)
Budget	-0.221	-0.296	0.237	0.0842	-0.0912	-0.0641	0.300	0.363
	(0.162)	(0.234)	(0.261)	(0.309)	(0.372)	(0.300)	(0.243)	(0.336)
budget_2	0.0393*	0.0427	-0.0162	-0.0180	0.0117	0.0158	-0.0214	-0.0372
	(0.0213)	(0.0298)	(0.0313)	(0.0356)	(0.0444)	(0.0392)	(0.0295)	(0.0425)
Fte	0.000167**	-0.000349	0.000494***	-0.000239	-0.000247	-5.18e-05	-0.000157	6.38e-06
	(6.97e-05)	(0.000219)	(0.000104)	(0.000221)	(0.000343)	(0.000258)	(0.000161)	(0.000227)
ftedigital_share	-0.0834	-0.00499	-0.0572	-0.101**	-0.0660	-0.0390	-0.00919	0.218***
	(0.0846)	(0.0705)	(0.0968)	(0.0451)	(0.114)	(0.0412)	(0.0960)	(0.0615)
gdp_pc	-5.63e-06	-3.51e-05***	1.95e-05***	-1.53e-05	-1.17e-05	-3.01e-05**	-3.21e-05***	-3.61e-05**
	(1.02e-05)	(1.12e-05)	(6.72e-06)	(1.28e-05)	(1.87e-05)	(1.23e-05)	(1.13e-05)	(1.56e-05)
Lpop	-0.119**	-0.249**	-0.174***	-0.197*	0.0241	-0.139	-0.00708	-0.0413
	(0.0578)	(0.0920)	(0.0478)	(0.103)	(0.122)	(0.0903)	(0.0712)	(0.130)
educ_15_64_mid_high	-0.0293***	0.000196	-0.00677	0.0461**	-0.00952	-0.0215	-0.0297	0.0138
	(0.00948)	(0.0195)	(0.00656)	(0.0211)	(0.0337)	(0.0177)	(0.0179)	(0.0324)
Itu	-0.0297**	-0.0105	-0.00813	-0.0104	0.0375	-0.0195	0.0296	0.0397
	(0.0136)	(0.0286)	(0.0126)	(0.0233)	(0.0330)	(0.0173)	(0.0180)	(0.0277)
t_audio_visual_archive	-1.435**	-0.389	-0.640	0.770	0.419	0.824	0.322	0.409
	(0.568)	(0.786)	(0.830)	(0.622)	(0.652)	(0.887)	(0.934)	(1.318)
t_film_institute	-0.00421	-0.807	-1.387	-1.326	0.425	-1.054	0.972**	-2.516***
	(0.327)	(2.395)	(0.873)	(1.152)	(1.177)	(2.253)	(0.445)	(0.755)
t_higher_educ_library	0.678*	0.157	0.226	-0.529	-1.527***	1.037*	-1.932***	-0.922*

	(0.342)	(0.446)	(0.382)	(0.362)	(0.295)	(0.533)	(0.350)	(0.497)
t_monument_care	0.908	-0.994	-1.973*	0.119	-0.0892	0.558	-1.031	1.718
	(0.554)	(0.865)	(1.127)	(1.346)	(0.977)	(0.656)	(0.783)	(1.980)
t_performing_arts	0.740*	0.562	1.526***	0.795	0.340	0.904*	0.618	-2.611***
	(0.404)	(0.460)	(0.540)	(1.351)	(1.043)	(0.486)	(0.785)	(0.460)
t_museum_history	0.269	-0.412	0.458*	0.918**	0.223	1.127***	-0.0234	0.663
	(0.399)	(0.454)	(0.233)	(0.332)	(0.339)	(0.369)	(0.408)	(0.517)
t_museum_ethnography	-1.039*	-0.251	0.686*	2.001**	0.304	0.432	-0.835	-0.746
	(0.589)	(0.484)	(0.372)	(0.906)	(0.825)	(0.712)	(0.743)	(0.876)
t_museum_nature	0.145	-1.386***	-0.0851	-0.983**	-1.429*	-1.079	-1.832***	-0.286
	(0.651)	(0.478)	(0.475)	(0.400)	(0.786)	(1.037)	(0.498)	(0.766)
t_museum_science	-0.771	-0.753	-0.160	-0.987*	0.717	1.197*	0.283	1.011
	(0.521)	(1.001)	(0.552)	(0.537)	(0.581)	(0.686)	(0.724)	(0.899)
t_national_archive	0.108	-1.381*	-0.560	1.635***	-1.137**	1.952***	-1.620***	0.637
	(0.525)	(0.703)	(0.381)	(0.455)	(0.423)	(0.496)	(0.540)	(0.696)
t_national_library	0.541	0.429	0.470	1.344*	0.929	2.817***	-1.034*	1.118
	(0.427)	(0.584)	(0.349)	(0.762)	(0.572)	(0.509)	(0.570)	(0.921)
t_other_archive	-0.176	-0.922**	-0.552**	1.499***	0.266	1.405***	-0.716	0.510
	(0.300)	(0.439)	(0.241)	(0.326)	(0.424)	(0.224)	(0.449)	(0.432)
t_other_type_of_institution	0.298	-0.309	-0.216	0.486	-0.443	0.786**	-0.656	0.960**
	(0.249)	(0.500)	(0.280)	(0.443)	(0.448)	(0.286)	(0.479)	(0.437)
t_public_library	-1.439***	-0.522	-0.689*	1.201***	-0.140	1.119**	-1.599***	-0.255
	(0.334)	(0.583)	(0.365)	(0.349)	(0.397)	(0.491)	(0.436)	(0.465)
t_special_library	0.115	-0.384	-0.958	0.00376	-1.257**	0.667**	-1.533***	0.532
	(0.567)	(0.533)	(0.661)	(0.714)	(0.558)	(0.316)	(0.528)	(0.624)
fund_internal	-0.00596	0.592	-0.336*	0.173	0.0829	0.851***	-0.249	0.629**
	(0.199)	(0.402)	(0.181)	(0.418)	(0.295)	(0.297)	(0.300)	(0.290)
fund_crowdfunding	0.277	0.0298	0.725	1.286	0.524	0.218	0.197	0.434
	(0.240)	(0.513)	(0.574)	(0.857)	(0.527)	(0.289)	(0.449)	(0.822)

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fund_nationalpublic	0.301*	0.414*	-0.0623	-0.124	-0.0106	0.122	0.126	0.0237
	(0.154)	(0.242)	(0.173)	(0.218)	(0.181)	(0.195)	(0.173)	(0.278)
fund_regionalpublic	-0.214	0.483**	0.223	0.667***	0.604***	-0.0469	0.392**	0.00839
	(0.156)	(0.224)	(0.237)	(0.221)	(0.211)	(0.285)	(0.186)	(0.393)
fund_privatefund	-0.260	-0.110	-0.0906	0.438	-0.0929	-0.0257	0.534*	-0.233
	(0.268)	(0.338)	(0.252)	(0.345)	(0.383)	(0.338)	(0.273)	(0.409)
fund_ppp	0.0850	0.0193	0.315	0.0980	0.765**	-0.326	-0.491**	0.324
	(0.392)	(0.366)	(0.230)	(0.467)	(0.320)	(0.372)	(0.237)	(0.525)
fund_salesdigital	0.0684	0.313	0.360	0.122	-0.0426	0.484	2.197***	0.709*
	(0.215)	(0.346)	(0.279)	(0.342)	(0.381)	(0.315)	(0.357)	(0.407)
fund_other	0.0503	-0.473	-0.283	-0.308	0.0173	0.371	-0.0629	0.966*
	(0.261)	(0.284)	(0.237)	(0.324)	(0.383)	(0.340)	(0.312)	(0.501)
Europe_Nordic	-0.648**	1.160***	0.650***	0.862**	0.848	0.0588	-0.0802	0.316
	(0.242)	(0.356)	(0.213)	(0.350)	(0.657)	(0.412)	(0.408)	(0.562)
Europe_West	-0.888***	0.762	-0.344	0.526	0.686	0.573	-0.109	-0.431
	(0.295)	(0.542)	(0.252)	(0.380)	(0.723)	(0.359)	(0.332)	(0.625)
Europe_British_Isles	-0.146	0.900***	1.556***	0.983***	2.322***	-1.176***	2.054***	0.745*
	(0.387)	(0.191)	(0.339)	(0.206)	(0.603)	(0.288)	(0.605)	(0.382)
Europe_South	-0.963**	0.544	0.923**	1.794**	0.901	-1.227**	0.294	1.412
	(0.393)	(0.705)	(0.353)	(0.729)	(1.403)	(0.507)	(0.524)	(0.977)
Europe_East	-0.979**	-0.0717	1.643***	0.895	0.00663	-1.036**	0.258	-0.278
	(0.402)	(0.705)	(0.406)	(0.669)	(1.113)	(0.456)	(0.514)	(0.758)
Europe_South_East	-0.459	0.517	1.544***	0.134	1.792*	0.169	0.431	0.525
	(0.333)	(0.654)	(0.372)	(0.548)	(0.983)	(0.426)	(0.448)	(0.837)
Constant	15.80***	10.70***	10.47***	3.699	3.308	12.10***	3.737*	-1.334
	(1.623)	(2.723)	(1.661)	(2.635)	(5.902)	(2.585)	(2.087)	(3.794)
Observations	725	725	725	725	725	725	725	725
R-squared	0.148	0.116	0.188	0.146	0.150	0.116	0.213	0.089

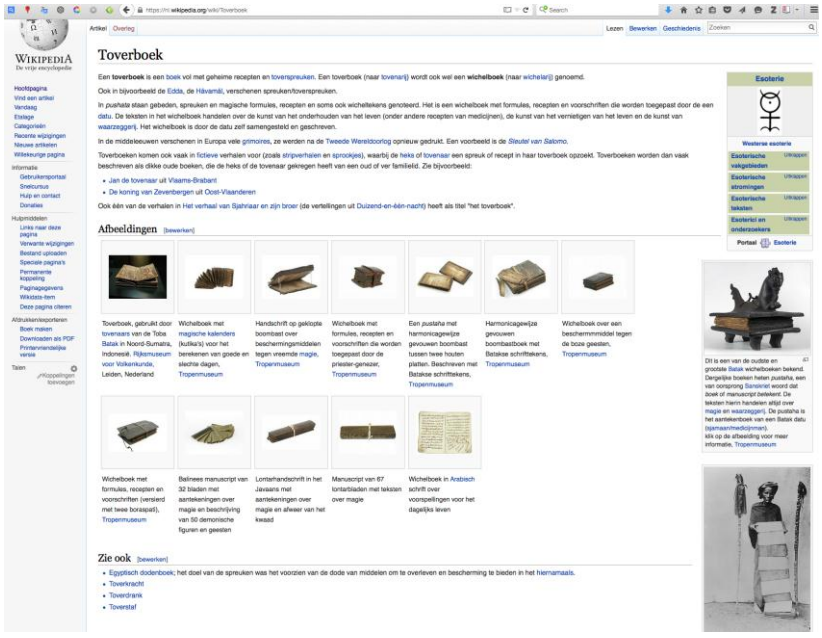
Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

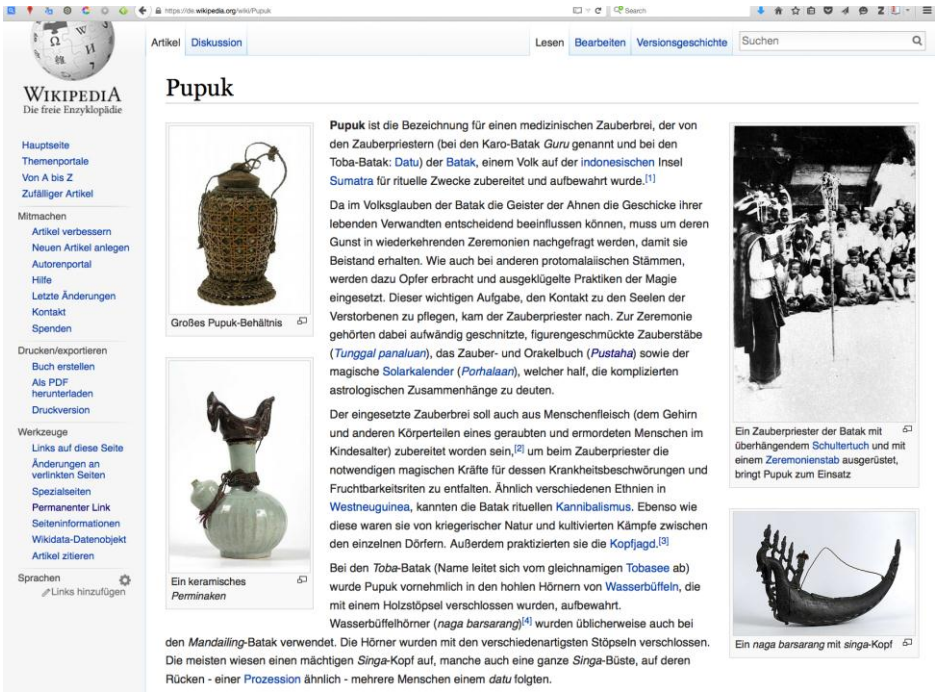
Appendix 5. Images of objects in the Wikipedia articles (selected languages)

5.A1 Kakawin Sutasoma Indonesian

5.A2 Pustaha Dutch



5.A3 Pupuk German



Pupuk

Pupuk ist die Bezeichnung für einen medizinischen Zauberbrei, der von den Zauberpriestern (bei den Karo-Batak *Guru* genannt und bei den Toba-Batak: Datu) der Batak, einem Volk auf der indonesischen Insel Sumatra für rituelle Zwecke zubereitet und aufbewahrt wurde.[1]

Da im Volksglauben der Batak die Geister der Ahnen die Geschicke ihrer lebenden Verwandten entscheidend beeinflussen können, muss um deren Gunst in wiederkehrenden Zeremonien nachgefragt werden, damit sie Beistand erhalten. Wie auch bei anderen protomalaiischen Stämmen, werden dazu Opfer erbracht und ausgeklügelte Praktiken der Magie eingesetzt. Dieser wichtigen Aufgabe, den Kontakt zu den Seelen der Verstorbenen zu pflegen, kam der Zauberpriester nach. Zur Zeremonie gehörten dabei aufwändig geschnitzte, figurengeschmückte Zauberstäbe (*Tunggal panaluan*), das Zauber- und Orakelbuch (*Pustaha*) sowie der magische Solarkalender (*Porhalaan*), welcher half, die komplizierten astrologischen Zusammenhänge zu deuten.

Großes Pupuk-Behältnis

Ein keramisches *Perminaken*

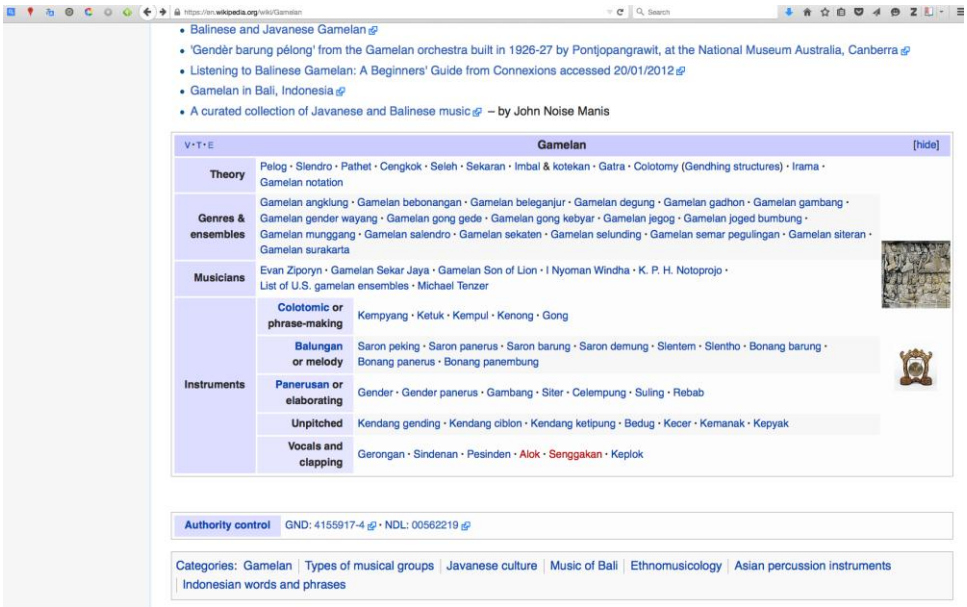
Der eingesetzte Zauberbrei soll auch aus Menschenfleisch (dem Gehirn und anderen Körperteilen eines geraubten und ermordeten Menschen im Kindesalter) zubereitet worden sein,[2] um beim Zauberpriester die notwendigen magischen Kräfte für dessen Krankheitsbeschwörungen und Fruchtbarkeitsriten zu entfalten. Ähnlich verschiedenen Ethnien in Westneuguinea, kannten die Batak rituellen Kannibalismus. Ebenso wie diese waren sie von kriegerischer Natur und kultivierten Kämpfe zwischen den einzelnen Dörfern. Außerdem praktizierten sie die Kopfjagd.[3]

Bei den *Toba*-Batak (Name leitet sich vom gleichnamigen Tobasee ab) wurde Pupuk vornehmlich in den hohlen Hörnern von Wasserbüffeln, die mit einem Holzstöpsel verschlossen wurden, aufbewahrt. Wasserbüffelhörner (*naga barsarang*)[4] wurden üblicherweise auch bei den *Mandailing*-Batak verwendet. Die Hörner wurden mit den verschiedenartigsten Stöpseln verschlossen. Die meisten wiesen einen mächtigen *Singa*-Kopf auf, manche auch eine ganze *Singa*-Büste, auf deren Rücken - einer Prozession ähnlich - mehrere Menschen einem *datu* folgten.

Ein Zauberpriester der Batak mit überhängendem Schultertuch und mit einem Zeremonienstab ausgerüstet, bringt Pupuk zum Einsatz

Ein *naga barsarang* mit *singa*-Kopf

5.A4 Hanging gong English (box at bottom of article)



- Balinese and Javanese Gamelan
- 'Gendèr barung pélong' from the Gamelan orchestra built in 1926-27 by Pontjopangrawit, at the National Museum Australia, Canberra
- Listening to Balinese Gamelan: A Beginners' Guide from Connexions accessed 20/01/2012
- Gamelan in Bali, Indonesia
- A curated collection of Javanese and Balinese music – by John Noise Manis

Gamelan [hide]

Theory		Pelog · Slendro · Pathet · Cengkok · Seleh · Sekaran · Imbal & kotekan · Gatra · Colotomy (Gendhing structures) · Irama · Gamelan notation
Genres & ensembles		Gamelan angklung · Gamelan bebonangan · Gamelan beleganjur · Gamelan degung · Gamelan gadhon · Gamelan gambang · Gamelan gender wayang · Gamelan gong gede · Gamelan gong kebyar · Gamelan jegog · Gamelan joged bumbung · Gamelan munggang · Gamelan salendro · Gamelan sekaten · Gamelan selunding · Gamelan semar pegulingan · Gamelan siteran · Gamelan surakarta
Musicians		Evan Ziporyn · Gamelan Sekar Jaya · Gamelan Son of Lion · I Nyoman Windha · K. P. H. Notoprojo · List of U.S. gamelan ensembles · Michael Tenzer
Instruments	Colotomic or phrase-making	Kempyang · Ketuk · Kempul · Kenong · Gong
	Balungan or melody	Saron peking · Saron panerus · Saron barung · Saron demung · Slentem · Slentho · Bonang barung · Bonang panerus · Bonang panembung
	Panerusan or elaborating	Gender · Gender panerus · Gambang · Siter · Celempung · Suling · Rebab
	Unpitched	Kendang gending · Kendang ciblon · Kendang ketipung · Bedug · Kecer · Kemanak · Kepyak
	Vocals and clapping	Gerongan · Sindenan · Pesinden · Alok · Senggakan · Keplok

Authority control GND: 4155917-4 · NDL: 00562219

Categories: Gamelan | Types of musical groups | Javanese culture | Music of Bali | Ethnomusicology | Asian percussion instruments | Indonesian words and phrases

5.A5 Slavery English (box on top of article)

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Slavery

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"Slave" and "Slaves" redirect here. For a 1969 film, see Slaves (film). For other uses, see Slave (disambiguation).

This article **has an unclear citation style**. The references used may be made clearer with a different or consistent style of citation, footnoting, or external linking. *In particular, citation titles should be specified, perhaps also check the split reference section (footnotes and bibliography) contain the correct sources.*. *(June 2015)*

Slavery is a legal or economic system in which principles of property law can apply to humans so that people can be treated as property,[1] and can be owned, bought and sold accordingly, and cannot withdraw unilaterally from the arrangement. While a person is a slave, the owner is entitled to the slave's labour, without any remuneration. The rights and protection of the slave may be regulated by laws and customs in a particular time and place, and a person may become a slave from the time of their capture, purchase or birth. Today, slavery is unlawful in all countries, but a person may still be described as a slave if he or she is forced to work for another person without an ability on their part to unilaterally terminate the arrangement. The present form of the slave trade is commonly referred to as human trafficking.

Slavery existed before written history and in many cultures.[2] It was once institutionally recognized by most societies, but has now been outlawed in all countries,[3][4] the last being Mauritania in 2007. However, it continues through such practices as debt bondage, serfdom, domestic servants kept in captivity, certain adoptions in which children are forced to work as slaves, child soldiers, human trafficking and forced marriage.[5] Accordingly, there are still an estimated 20 million to 36 million slaves worldwide.[6][7][8]

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Slavery

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5.A6 Kris of Knaud English

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Kris of Knaud

From Wikipedia, the free encyclopedia

The **Kris of Knaud**, also known as the **Keris of Knaud** or **Knaud's Kris**, is the oldest known kris surviving in the world.[1] Given to Charles Knaud, a Dutch physician, by Paku Alam V in the 19th century, the kris is on display at the Tropenmuseum, Royal Tropical Institute, Amsterdam.

Contents [hide]
1 The history of the kris
2 References
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The history of the kris [edit]

The kris bears the date of 1264 (which correspondends to 1342 AD) in its iron blade. Scientists suspect that due to its special features the kris is even older, but was decorated during the heyday of the Majapahit kingdom to celebrate an important event.[2] The kris bears scenes from the Ramayana on an unusual thin copper layer which partially covers it.

Charles Knaud (Batavia 1840 - Amsterdam 1897) was a Dutch physician and dukun (shaman) at the court of Yogyakarta. Knaud, who had studied Javanese mysticism, treated and cured the son of Paku Alam V (1878-1900), ruler of the hereditary Pakualaman principality in the Sultanate of Yogyakarta, of what the ruler believed to be "guna guna" (black magic). For saving his son's life, Paku Alam V, who was also a freemason at the Mataram lodge of Jogja,[3] granted him a prestigious heirloom, a kris.[4] It was the oldest kris in the prince's collection.[5]

Paku Alam VIII, successor to Paku Alam V.

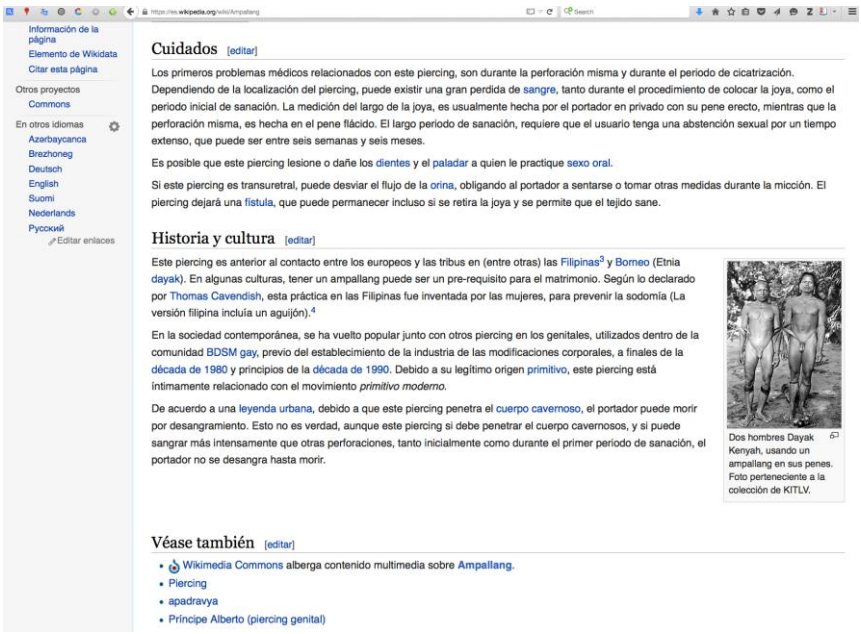
From 1903, the kris was believed to be lost, but it remained in the possession of Knaud's family. Long after Knaud's death, during World War II, his family buried the Keris in their garden to protect it during the Japanese occupation. During the Indonesian National Revolution, they took it to the Netherlands, where it was safeguarded in the family's bank safe.[6]

In the 19th century, a plaster cast and a photograph of the kris were kept in the holdings of the Bataviaasch Museum of Arts and Archaeology. In 1920, N.J. Krom dedicated a full page to the keris in *Hindoe-Javaansche Kunst*. David van Duuren a curator with the Royal Tropical Institute happened to ask Knaud's descendant, Kurht Knaud, if he was aware of the rare kris that had once been in his family's possession and was surprised to discover it still was. Kurht Knaud loaned the keris to the Royal Tropical Institute, K.I.T., Amsterdam, where it has been displayed since February 2003.[6]

5.A7 Berbers French (box on top of article)

5.A8 Gymnocrex Japanese

5.A9 Piercing Spanish



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Cuidados [editar]

Los primeros problemas médicos relacionados con este piercing, son durante la perforación misma y durante el periodo de cicatrización. Dependiendo de la localización del piercing, puede existir una gran perdida de sangre, tanto durante el procedimiento de colocar la joya, como el periodo inicial de sanación. La medición del largo de la joya, es usualmente hecha por el portador en privado con su pene erecto, mientras que la perforación misma, es hecha en el pene flácido. El largo periodo de sanación, requiere que el usuario tenga una abstención sexual por un tiempo extenso, que puede ser entre seis semanas y seis meses.

Es posible que este piercing lesione o dañe los dientes y el paladar a quien le practique sexo oral.

Si este piercing es transuretral, puede desviar el flujo de la orina, obligando al portador a sentarse o tomar otras medidas durante la micción. El piercing dejará una fístula, que puede permanecer incluso si se retira la joya y se permite que el tejido sane.

Historia y cultura [editar]

Este piercing es anterior al contacto entre los europeos y las tribus en (entre otras) las Filipinas[3] y Borneo (Etnia dayak). En algunas culturas, tener un ampallang puede ser un pre-requisito para el matrimonio. Según lo declarado por Thomas Cavendish, esta práctica en las Filipinas fue inventada por las mujeres, para prevenir la sodomía (La versión filipina incluía un aguijón).[4]

En la sociedad contemporánea, se ha vuelto popular junto con otros piercing en los genitales, utilizados dentro de la comunidad BDSM gay, previo del establecimiento de la industria de las modificaciones corporales, a finales de la década de 1980 y principios de la década de 1990. Debido a su legítimo origen primitivo, este piercing está íntimamente relacionado con el movimiento *primitivo moderno*.

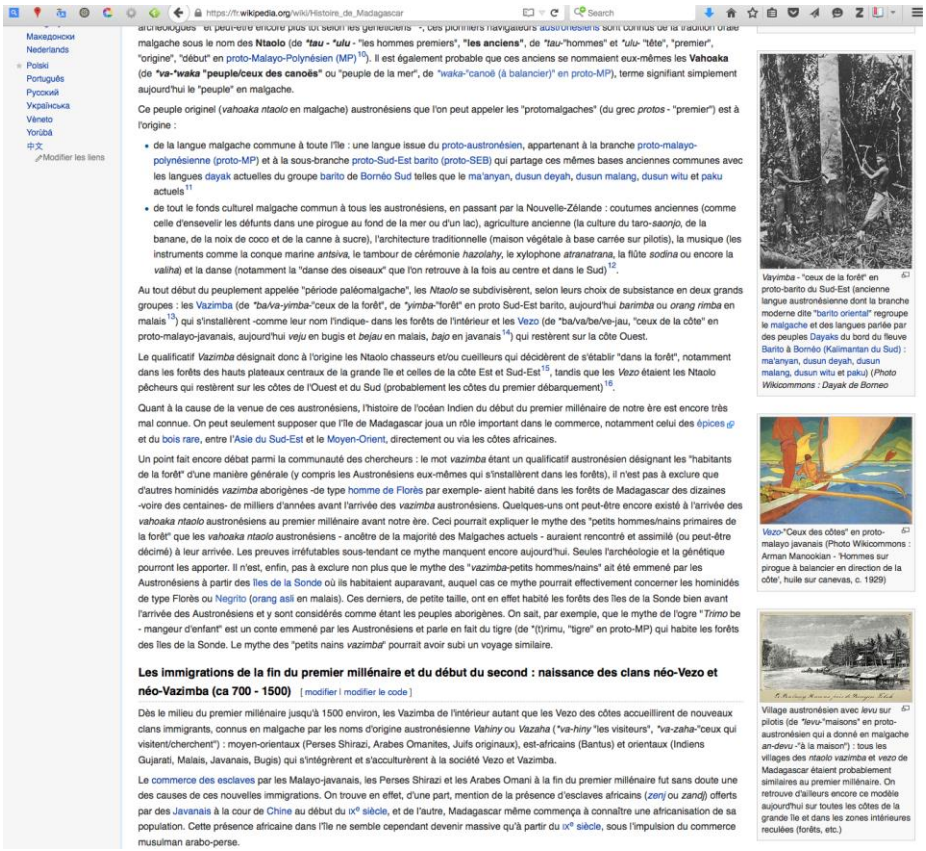
De acuerdo a una leyenda urbana, debido a que este piercing penetra el cuerpo cavernoso, el portador puede morir por desangramiento. Esto no es verdad, aunque este piercing si debe penetrar el cuerpo cavernosos, y si puede sangrar más intensamente que otras perforaciones, tanto inicialmente como durante el primer periodo de sanación, el portador no se desangra hasta morir.

Dos hombres Dayak Kenyah, usando un ampallang en sus penes. Foto perteneciente a la colección de KITLV.

Véase también [editar]

- Wikimedia Commons alberga contenido multimedia sobre Ampallang.
- Piercing
- apadravya
- Príncipe Alberto (piercing genital)

5.A10 History of Madagascar French



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malgache sous le nom des **Ntaolo** (de ***tau - *ulu*** - "les hommes premiers", **"les anciens"**, de *tau-*"hommes" et *ulu-* "tête", "premier", "origine", "début" en proto-Malayo-Polynésien (MP)[10]). Il est également probable que ces anciens se nommaient eux-mêmes les **Vahoaka** (de ***va-*waka "peuple/ceux des canoës"** ou "peuple de la mer", de *waka-*"canoë (à balancier)" en proto-MP), terme signifiant simplement aujourd'hui le "peuple" en malgache.

Ce peuple originel (*vahoaka ntaolo* en malgache) austronésiens que l'on peut appeler les "protomalgaches" (du grec *protos* - "premier") est à l'origine :

- de la langue malgache commune à toute l'Ile : une langue issue du proto-austronésien, appartenant à la branche proto-malayo-polynésienne (proto-MP) et à la sous-branche proto-Sud-Est barito (proto-SEB) qui partage ces mêmes bases anciennes communes avec les langues dayak actuelles du groupe barito de Bornéo Sud telles que le ma'anyan, dusun deyah, dusun malang, dusun witu et paku actuels[11]
- de tout le fonds culturel malgache commun à tous les austronésiens, en passant par la Nouvelle-Zélande : coutumes anciennes (comme celle d'ensevelir les défunts dans une pirogue au fond de la mer ou d'un lac), agriculture ancienne (la culture du taro-*saonjo*, de la banane, de la noix de coco et de la canne à sucre), l'architecture traditionnelle (maison végétale à base carrée sur pilotis), la musique (les instruments comme la conque marine *antsiva*, le tambour de cérémonie *hazolahy*, le xylophone *atranatrana*, la flûte *sodina* ou encore la *valiha*) et la danse (notamment la "danse des oiseaux" que l'on retrouve à la fois au centre et dans le Sud)[12].

Au tout début du peuplement appelée "période paléomalgache", les *Ntaolo* se subdivisèrent, selon leurs choix de subsistance en deux grands groupes : les Vazimba (de *"ba/va-yimba-*"ceux de la forêt", de *"yimba-*"forêt" en proto Sud-Est barito, aujourd'hui *barimba* ou *orang rimba* en malais[13]) qui s'installèrent -comme leur nom l'indique- dans les forêts de l'intérieur et les Vezo (de "ba/va/be/ve-jau, "ceux de la côte" en proto-malayo-javanais, aujourd'hui *veju* en bugis et *bejau* en malais, *bajo* en javanais[14]) qui restèrent sur la côte Ouest.

Le qualificatif *Vazimba* désignait donc à l'origine les Ntaolo chasseurs et/ou cueilleurs qui décidèrent de s'établir "dans la forêt", notamment dans les forêts des hauts plateaux centraux de la grande Ile et celles de la côte Est et Sud-Est[15], tandis que les *Vezo* étaient les Ntaolo pêcheurs qui restèrent sur les côtes de l'Ouest et du Sud (probablement les côtes du premier débarquement)[16].

Quant à la cause de la venue de ces austronésiens, l'histoire de l'océan Indien du début du premier millénaire de notre ère est encore très mal connue. On peut seulement supposer que l'Ile de Madagascar joua un rôle important dans le commerce, notamment celui des épices et du bois rare, entre l'Asie du Sud-Est et le Moyen-Orient, directement ou via les côtes africaines.

Un point fait encore débat parmi la communauté des chercheurs : le mot *vazimba* étant un qualificatif austronésien désignant les "habitants de la forêt" d'une manière générale (y compris les Austronésiens eux-mêmes qui s'installèrent dans les forêts), il n'est pas à exclure que d'autres hominidés *vazimba* aborigènes -de type homme de Florès par exemple- aient habité dans les forêts de Madagascar des dizaines -voire des centaines- de milliers d'années avant l'arrivée des *vazimba* austronésiens. Quelques-uns ont peut-être encore existé à l'arrivée des *vahoaka ntaolo* austronésiens au premier millénaire avant notre ère. Ceci pourrait expliquer le mythe des "petits hommes/nains primaires de la forêt" que les *vahoaka ntaolo* austronésiens - ancêtre de la majorité des Malgaches actuels - auraient rencontré et assimilé (ou peut-être décimé) à leur arrivée. Les preuves irréfutables sous-tendant ce mythe manquent encore aujourd'hui. Seules l'archéologie et la génétique pourront les apporter. Il n'est, enfin, pas à exclure non plus que le mythe des "*vazimba*-petits hommes/nains" ait été emmené par les Austronésiens à partir des Iles de la Sonde où ils habitaient auparavant, auquel cas ce mythe pourrait effectivement concerner les hominidés de type Florès ou Negrito (orang asli en malais). Ces derniers, de petite taille, ont en effet habité les forêts des Iles de la Sonde bien avant l'arrivée des Austronésiens et y sont considérés comme étant les peuples aborigènes. On sait, par exemple, que le mythe de l'ogre "*Trimo* be - mangeur d'enfant" est un conte emmené par les Austronésiens et parle en fait du tigre (de *(t)rimu, "tigre" en proto-MP) qui habite les forêts des Iles de la Sonde. Le mythe des "petits nains *vazimba*" pourrait avoir subi un voyage similaire.

Les immigrations de la fin du premier millénaire et du début du second : naissance des clans néo-Vezo et néo-Vazimba (ca 700 - 1500) [modifier | modifier le code]

Dès le milieu du premier millénaire jusqu'à 1500 environ, les Vazimba de l'intérieur autant que les Vezo des côtes accueillirent de nouveaux clans immigrants, connus en malgache par les noms d'origine austronésienne *Vahiny* ou *Vazaha* (*"va-hiny* "les visiteurs", *"va-zaha-*"ceux qui visitent/cherchent") : moyen-orientaux (Perses Shirazi, Arabes Omanites, Juifs originaux), est-africains (Bantus) et orientaux (Indiens Gujarati, Malais, Javanais, Bugis) qui s'intégrèrent et s'acculturèrent à la société Vezo et Vazimba.

Le commerce des esclaves par les Malayo-javanais, les Perses Shirazi et les Arabes Omani à la fin du premier millénaire fut sans doute une des causes de ces nouvelles immigrations. On trouve en effet, d'une part, mention de la présence d'esclaves africains (*zenj* ou *zandj*) offerts par des Javanais à la cour de Chine au début du IXe siècle, et de l'autre, Madagascar même commença à connaître une africanisation de sa population. Cette présence africaine dans l'Ile ne semble cependant devenir massive qu'à partir du IXe siècle, sous l'impulsion du commerce musulman arabo-perse.

Vayimba - "ceux de la forêt" en proto-barito du Sud-Est (ancienne langue austronésienne dont la branche moderne dite "barito oriental" regroupe le malgache et des langues parlée par des peuples Dayaks du bord du fleuve Barito à Bornéo (Kalimantan du Sud) : ma'anyan, dusun deyah, dusun malang, dusun witu et paku) *(Photo Wikicommons : Dayak de Borneo*

Vezo-"Ceux des côtes" en proto-malayo javanais (Photo Wikicommons : Arman Manookian - 'Hommes sur pirogue à balancier en direction de la côte', huile sur canevas, c. 1929)

Village austronésien avec *levu* sur pilotis (de *"levu-*"maisons" en proto-austronésien qui a donné en malgache *an-devu -*'à la maison") : tous les villages des *ntaolo vazimba* et *vezo* de Madagascar étaient probablement similaires au premier millénaire. On retrouve d'ailleurs encore ce modèle aujourd'hui sur toutes les côtes de la grande Ile et dans les zones intérieures reculées (forêts, etc.)

RICHES
RENEWAL, INNOVATION AND CHANGE: HERITAGE AND EUROPEAN SOCIETY

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Renewal, Innovation and Change: Heritage and European Society

Appendix 5.B. Full list of objects analyzed

Selected objects		Main article	Type of object	Date of creation	First uploaded	First in article	First lang.	Total # art.	Total # lang.	Object number
	1	Kakawin Sutasoma	Gold piece	1295-1525	Jul-10	Oct-10	EN, FR	4	3	TMnr 2960-319
	2	Pustaha	Wooden book	1852-1857	Jul-10	Dec-10	ID	6	5	TMnr A-1389
	3	Singa	Magic horn	1852-1857	Jul-10	Jan-11	EN, DE	2	2	TMnr A-3932
	4	Gong	Hanging gong	1939	Jul-10	Dec-11	NL	73	5	TMnr 1340-13
	5	Slavery	Prison feet cuffs	1971	Jul-12	Aug-12	EN	348	4	TM-3912-475
	6	Kris of Knaud	Photograph of Javanese Prince	1983	Nov-09	Mar-11	EN, NL	3	3	TMnr 10002783
	7	Women in Morocco	Photograph of Berber woman	1940-1960	Jul-12	Feb-13	FR	7	5	TMnr 60033850
	8	Gymnocrex	Photograph of Blue-faced rail	1949	Nov-09	Dec-09	JA	23	19	TMnr 10006477
	9	Piercing	Photograph of two Kenyan Dayaks	1920	Nov-09	Dec-09	EN	12	8	TMnr 10005628
	10	History of Madagascar	Photograph of men cutting tree in Borneo	1900-1940	Nov-09	Oct-11	FR	15	3	TMnr 60045266
Additional objects	11	Dayak people	photograph of house interior	1900-1930	Nov-09	Feb-10	EN	3	3	TMnr 10018343
	12	Dayak people	photograph of Dayak	1920	Nov-09	Feb-15	EN	1	1	TMnr 10005510
	13	Dayak people	photograph of longhouses	1894	Nov-09	Feb-15	EN	3	2	TMnr 60010391
	14	Dayak people	photograph of Dayak performers	1898-1900	Nov-09	Feb-15	EN	2	2	TMnr 60001698
	15	Dayak people	photograph of Dayak chief	1900-1940	Nov-09	Mar-10	EN	7	7	TMnr 60033041
	16	Dayak people	photograph of Islamic Dayaks	1920	Nov-09	Feb-15	EN	4	2	TMnr 10005854
	17	Dayak people	photograph of Dayak headhunters	1927	Nov-09	Mar-10	EN	8	7	TMnr 60034031
	18	Dayak people	photograph of head of Dayaks in Borneo	1890-1920	Nov-09	Sep-11	EN	6	4	TMnr 60046407
	19	Dayak people	photograph of child in front of grave	1900-1940	Nov-09	Aug-11	ID	2	1	TMnr 10017057
	20	Principalities	photograph of Dutch governor and Sultan of Jakarta	1930-1940	Nov-09	Mar-11	NL	3	1	TMnr 60033564
	21	Principalities	photograph of Islamic procession	1921-1926	Nov-09	Mar-11	NL	2	1	TMnr 10001876
	22	Keris	photograph of man preparing pipe	1943	Nov-09	Feb-11	NL	2	1	TMnr 10005879
	23	Keris	Oldest known kris	1342	Aug-09	Sep-09	NL	11	4	TM-6046-1
	24	Keris	kirs handle of god figure	1954	Aug-09	Oct-09	NL	3	3	TM-2322-13a
	25	Keris	polychrome figure holding kris	1915	Jul-10	Nov-10	DE	1	1	TMnr 739-1
	26	Keris	sitting Chinese figure	1915	Jul-10	Nov-10	DE	1	1	TMnr 1468-91
	27	Keris	Kris handle Garuda	1940	Jul-10	Nov-10	DE	1	1	TMnr 1772-2340
	28	Keris	kris handle made of fossil	1940	Jul-10	Nov-10	DE	1	1	TMnr 1772-919

29	Keris	kris handle with curved Garuda	1940	Jul-10	Nov-10	DE	1	1	TMnr 1772-428
30	Keris	Kris with head of demon with diamond eyes	1883	Jul-10	Nov-10	DE	3	3	TMnr H-6
31	Keris	kris handle curved	1940	Jul-10	Nov-10	DE	1	1	TMnr 1772-899
32	Keris	Kris handle with flowers	1940	Jul-10	Nov-10	DE	1	1	TMnr 1772-913
33	Keris	Kris Naga	1887	Jul-10	Nov-10	DE	1	1	TMnr A-5864
34	Keris	photograph of barong dancer	1910-1920	Nov-09	Jul-10	DE	0	0	TMnr 10022022
35	Keris	Kris handle with curved demon		Aug-09	Nov-10	DE	1	1	TM-1772-437
36	Keris	Keris sheath	1924	Jul-10	Mar-14	EN	1	1	TMnr 214-71
37	Keris	photograph of kris dancers	1971	Nov-09	Feb-10	EN	7	5	TMnr 20018470
38	Keris	photograph of kris and kris holder	1910-1930	Nov-09	Nov-10	ID	1	1	TMnr 10026839
39	Keris	kris and scabbard	26-Feb-09	Apr-09	Sep-10	ID	6	5	RV-360-8082
40	Slavery	Maroons art clay piece	1963	Sep-09	Oct-09	NL	1	1	TMnr 3325-73
41	Slavery	neck cuff	1959	Sep-09	Oct-09	NL	3	2	TMnr 2766-3
42	Slavery	slave stamp	1877	Sep-09	Oct-09	NL	2	1	TMnr H-2978
43	Slavery	slave release letter	1860	Sep-09	Oct-09	NL	2	2	TMnr 0-302
44	Slavery	video of emancipation in Paramaribo news	1963	Apr-11	Nov-11	NL	4	1	NIBG
45	Slavery	Dutch slavery emancipation law document	1862	Jan-14	Jan-14	NL	1	1	NA
46	History of Slavery	lithograph of slave funeral	1840-1850	Nov-09	Nov-09	EN	30	7	TMnr 3444-7
47	History of Slavery	Jan Mostaert: Portrait of an African Man	1525-1530	Jul-09	Dec-12	EN	27	7	Rijksmuseum
48	History of Suriname	Dirk Valkenburg: plantation	1707	Apr-08	Feb-15	NL	28	9	TMnr 3912-475
49	History of Suriname	photograph of Maroon woman	1946	Sep-09	Nov-09	ES	2	2	TMnr 10019385
50	History of Suriname	photograph of Brokopondo dam	1963	Sep-09	Nov-09	ES	10	6	TMnr 60044067
51	Gamelan	Bonang	1928	Jul-10	Jul-14	EN	2	2	TMnr 500-20
52	Gamelan	Gender	1928	Jul-10	Jul-14	EN	2	1	TMnr 500-4
53	Gamelan	Gong	1928	Jul-10	Jul-14	EN	2	2	TMnr 500-26a
54	Gamelan	Kendang	1928	Jul-10	Jul-14	EN	1	1	TMnr 500-7
55	Gamelan	Kenong	1928	Jul-10	Jul-14	EN	1	1	TMnr 500-21
56	Gamelan	Peking	1928	Jul-10	Jul-14	EN	1	1	TMnr 500-1
57	Gamelan	Saron	1928	Jul-10	Jul-14	EN	1	1	TMnr 500-11
58	Gamelan	Slenthem	1928	Jul-10	Jul-14	EN	2	2	TMnr 500-16
59	Gamelan	photograph of gamelan orchestra	1870-1891	Nov-09	Jan-01	EN	2	2	TMnr 60015940
60	Gamelan	photograph of young angluk players	1918	Nov-09	Jul-10	JA	4	4	TMnr 10017867

61	Gamelan	photograph of gamelan orchestra	1910-1930	Nov-09	Jul-10	JA	4	4	TMnr 10026902
62	Gamelan	photograph of rebab player	1945-1955	Nov-09	Jul-10	JA	17	11	TMnr 60052115
63	Gamelan	photograph of Balinese dancer Mario	1940	Nov-09	Jul-10	JA	8	5	TMnr 10004713
64	Gamelan	photograph of man playing ketuk	1966	Nov-09	Jul-10	JA	1	1	TMnr 20000380
65	Gamelan		1971	Nov-09	Jul-10	JA	1	1	TMnr 20000315
66	Gamelan	photograph of two Balinese dancers	1929	Dec-09	Jul-10	JA	40	13	TMnr 10004678b
67	Gamelan	photograph of Balinese dancer with gold crown	1952	Nov-09	Jul-10	JA	1	1	TMnr 10004733
68	Gamelan	photograph of gamelan orchestra in Bali	1920-1921	Nov-09	Jul-10	JA	1	1	TMnr 60008125
69	Gamelan	photograph of gamelan orchestra and dancers	1952	Nov-09	Jul-10	JA	1	1	TMnr 10004737
70	Gamelan	photograph of gamelan orchestra and dancers	1952	Nov-09	Jul-10	JA	1	1	TMnr 10004734
71	Gamelan	photograph of gamelan orchestra and kebyar dance	1952	Nov-09	Jul-10	JA	1	1	TMnr 10004738
72	Gamelan	photograph of two gamelan players	1900-1940	Nov-09	Jul-10	JA	1	1	TMnr 60030949
73	Gamelan	photograph of gamelan orchestra	1949	Nov-09	Jul-10	JA	1	1	TMnr 10003354
74	Angklung	photograph of school children in angklung orchestra	1971	Nov-09	Mar-10	ID	2	2	TMnr 20000366
75	Book of spells	photograph of Batak datu with book of spells	1900-1940	Nov-09	Jul-10	NL	7	2	TMnr 10016338
76	Book of spells	Magic text in Balinese	1969	Jul-10	Apr-15	NL	2	2	TMnr 3798-5
77	Book of spells	Book of spells decorated	1947	Jul-10	Apr-15	NL	1	1	TMnr 1754-1
78	Book of spells	Book of spells with protection against angry spirits	1921	Jul-10	Apr-15	NL	1	1	TMnr 137-567
79	Book of spells	Priest book	2001	Jul-10	Apr-15	NL	1	1	TMnr 5924-1
80	Book of spells	Priest book	2001	Jul-10	Apr-15	NL	2	1	TMnr 5924-2
80	Book of spells	Book of spells with recipes used by priests	1921	Jul-10	Apr-15	NL	1	1	TMnr 137-573
82	Book of spells	Book with protection against black magic	1935	Jul-10	Apr-15	NL	1	1	TMnr 990-1
83	Book of spells	Book of spells with calendar for good and bad days	1892	Jul-10	Apr-15	NL	2	1	TMnr 1322-162
84	Book of spells	Balinese manuscript about magic	1944	Jul-10	Apr-15	NL	1	1	TMnr 1646-35
85	Book of spells	Text about magic in Javan	1938	Jul-10	Apr-15	NL	1	1	TMnr 1221-2
86	Book of spells	Manuscript with 67 pages of magic text	1920	Jul-10	Apr-15	NL	1	1	TMnr A-4849a
87	Book of spells	Spell book in Arabic to predict life	1931	Jul-10	Apr-15	NL	1	1	TMnr 674-587
88	Pustaha	photograph of datu house	1900-1930	Nov-09	Aug-11	DE	1	1	TMnr 60028777
89	Pustaha	photograph of Batak priest	1939	Nov-09	Aug-11	DE	3	1	TMnr 10000926
90	Pupuk	jar for magical potions	1921	Jul-10	Aug-11	DE	1	1	TMnr 137-633
91	Pupuk	medicine jar	1914	Jul-10	Jan-11	DE	1	1	TMnr 2761-658a
92	Berber jewelry	Necklace with 5 Fatima hands	1940-1960	Jul-10	Feb-15	DE	3	3	TMnr 5070-2

93	Berber jewelry	Two silver pins	1900-1925	Jul-10	Feb-15	DE	1	1	TMnr 6387-2
94	Berber jewelry	silver earring with corals	1971	Jul-10	Feb-15	DE	1	1	TMnr 3957-4a
95	Berber jewelry	silver anklet	1969	Jul-10	Feb-15	DE	1	1	TMnr 3833-237a
96	Madagascar	engraving of village	1893	Jul-10	Oct-11	FR	19	5	TMnr 3219-14
97	Madagascar	lithograph of Dayak sarcophagus	1887	Jul-10	Oct-11	FR	5	3	TMnr 5795-29
98	Madagascar	photograph of Borobudur temple relief	1960-1980	Nov-09	Jun-13	FR	7	4	TMnr 20025669