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Ignas Kapleris, photo: Andrius Valužis (LDM)

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abstract | abstrakt ▷

Under the "Hype Cycle" methodology developed by the United States of America (USA) research company "Gartner", the digital media adaptation called "Technology Trigger" started in Lithuanian museums in 1989. The Innovator was the Lithuanian Art Museum (LDM), who first introduced digital management system of the collection's data. In 1996-1998 first independent museum websites were launched. About the year 2001 the Peak of "Inflated Expectations" was reached which is illustrated by the concept of the unified Lithuanian Museum Information System (LIMIS). However, it was not realized which caused the phase of "Trough of Disillusionment". Changes took place in 2004-2005. Then the digitization strategy of a national cultural heritage was created. By taking advantage of the European Union (EU) financial support and co-operating with other memory institutions, Lithuania museums stepped into the phase of "Slope of Enlightenment". In 2010, Lithuanian museums reached the beginning of the "Plateau of Productivity", which is witnessed by the finally operating system LIMIS.

V roce 1989 začala litevská muzea na základě metodologie „Hype Cycle" (vyvinuté firmou „Gartner" ve Spojených Státech Amerických) adaptovat digitální média v rámci akce nazvané „Technology Trigger". Inovátorem se stalo Litevské muzeum umění (LDM), které nejprve představilo digitální systém řízení pro sbírková data. V letech 1996 – 1998 byly zřízeny první nezávislé webové stránky muzeí. Kolem roku 2001 bylo dosaženo vrcholu „přehnaného očekávání", toto je ilustrováno v koncepci jednotného informačního systému litevských muzeí (LIMIS). Nicméně toto realizováno nebylo a díky tomu nastala fáze „skrz deziluzi". Situace se začala měnit v letech 2004 – 2005. Poté byla vytvořena strategie digitalizace národního kulturního dědictví. Využitím finanční podpory Evropské unie a spoluprací s dalšími paměťovými institucemi se litevská muzea dostala do fáze „ustálení produktivity", jejíž svědkem je finální operační systém LIMIS

Introduction

The application of Information and Communication Technologies (ICT) in museums is one of the most popular themes of the modern museology, which is often dealt with more emphasis placed on the technological aspects. The aspects of systematic changes caused by ICT are more important. External changes are related with the formation of network society[1], which definitely has an influence on museums as public institutions, whose mission is to serve for the public[2]. The internal changes can be named as the strengthening of information and communication paradigms in museology. Heritage communication becomes the most important mission of the museum. According to Marshall McLuhan's theory[3], the museums and artefacts stored in it, are treated as information carriers – medias. Due to the extremely rapid development of digital ICT, a new need arises to assess the change of the media. One of such tests could be found in Lev Manovich's book "The Language of the New Media"[4], where digital media[5] theory is presented.

However, new media application in memory institutions, historically, was unequal in different countries of the current European Union. „Iron Curtain" was one of the reasons, which led to the technological lag of the Soviet Eastern Block comparing with Western countries. Significant ICT inventions, beginning with the first digital calculating machine ENIAC ending with a personal computer and the Internet were invented in the United States[6], and not in the communist Soviet Union or its satellite countries. Analogical tendencies dominated in the cultural and humanities needs for digital technologies. In Western countries, in late 1940', the digital computing machines were already used for the humanities relative to museology[7]. In 1960's the first digital management systems of the museum collections' data appeared in USA[8]. According to inventor of the first Lithuanian computers (it were also the first in the Soviet Union) in 1960's, Laimutis Telksnys, the use of computers in the field of humanities in Lithuania starts only after the independence, because the Soviet Union considered the digital technologies as a priority only in a military

Fig.2: „Heart" of LIMIS – Rack type box, which contains service station of LIMIS system in Lithuanian Art Museum LIMIS centre. The service station includes 4 Blade type servers, data storage, reserve copying device and source of continuous power supply.

1 Manuel Castells, *Tinklaveikos visuomenės raida,* Vilnius 2005.
2 Rimvydas Laužikas, 'Lietuvos muziejų komunikacinė veikla'. In. R. Laužikas, ed., *Išlaidos ir investicijos: Lietuvos muziejai 1995-2011 metais,* Vilnius, 2013.
3 Marshall McLuhan, *Kaip suprasti medijas: Žmogaus tęsiniai,* Vilnius 2003
4 Lev Manovich, *Naujųjų medijų kalba,* Vilnius 2009
5 The keyword *digital media* are defined as communication means and channels created by a binary digital coding technology, and which are used by museums to implement cultural heritage communications in order to achieve the main function of the museum – the community service – and development of various forms of capital values. Often for digital media synonymous term of *new media* is applied.
6 Martin Campbell-Kelly - William Aspray, Computer: A History Of The Information Machine, Second Edition, Oxford 2009, pp. 69-93, 205-231, 255-281.
7 Susan Hockey, 'The History of Humanities Computing', in: S. Schreibman, R. Siemens, J. Unsworth ed., *A Companion to Digital Humanities,* Oxford 2004, (accessed 24/8/2013).
8 Katherine Burton-Jones, 'The transformation of the Digital museum', in: P. F. Marty, K. Jones ed., *Museum informatics: people, information, and technology in museums,* New York, London 2007, pp. 10.

Fig.1: The only one having such power and scanning range in Lithuania, and few years ago in all Baltic states – wide range Cruse museum scanner at work in Lithuanian Art Museum LIMIS centre.

sphere[9]. Digital computing machines created in Soviet Lithuania were used in exact sciences, medicine, and economic needs, it did not reach the culture due to ideological and technical reasons.

In 1990 the restoration of Lithuania's independence and the country's opening to the Western innovations coincided with the rapid development of digital technologies worldwide. First of all it was cheaper and more functional personal computers and the coming and development of World Wide Web. This made it possible to adapt ICT in „unknown" areas – humanities, memory institutions and heritage preservation. After more than 20 years of computer use in Lithuanian museums start it is important from a historical perspective identify and evaluate digital media adaptation stages in these institutions and determine which of them is now the country's museums. This enables to compare the situation in Lithuania and in other European Union countries as well as the global leaders of the museums digitization[10]. The object of this research is to analyse the evolution of ICT transference by emphasizing its main stages. This article is included with the documents (interview, statistics) and method of comparative critical analysis.

Lithuanian scientists have recently started to take interest more seriously on the digitization of cultural heritage problems. Years 2010-2012 could be considered as a turning point in this field, that shows the growing number of scientific papers on this subject[11]. Here can be seen a few trends. Firstly, it is focused mostly on curatorial approach, the quality of carried projects and the identification of organizational and technical issues. Thus the digitization of cultural heritage is formed as connecting the memory institutions activities rather than separating in knowledge sense. The digitisation of the cultural heritage forms the understanding about the activity of memory institutions.

[9] Ignas Kapleris interview with Laimutis Telksnys, 2012.

[10] *Digitization* term is seen as broad process according to scholar R. Laužikas (2012), who researches the application of digital technologies in Lithuania memory institutions „...the concept of digitization includes all objects, which are created using the binomial forms of coding acquisition and transmission of information<...>... talking about the interaction of „digital" documents and analog reality we need to understand that speaking in terms of systems digital photography is not a manuscript copy, as the printed version of this digital photography is not the copy of this photograph.<...>.. analog and "digitized" documents are definitely related semantically, but each is a completely unique document with its own evolution and its own life-cycle... ".

[11] For example: Rasa Strolytė, 'Kultūros paveldo skaitmeninio turinio sklaida Lietuvoje: projekto vykdytojų požiūris'. *Skaitmeninimas: Lietuvos muziejai 2010, (2010),* pp. 117-136.; Regina Varnienė-Janssen, 'Lietuvos kultūros paveldas atsiveria pasauliui: metodologiniai, technologiniai ir organizaciniai sprendimai', Vilnius 2010.; Margarita Gaubytė, 'Lietuvos muziejų interneto svetainių tyrimo rezultatai', *Muziejų skaitmeniniai leidiniai: teorija ir praktika, (2011),* pp. 19-36.; Arūnas Gudinavičius, 'Lietuvos rankraštinio paveldo publikavimas skaitmeninėje erdvėje: skaitmenintų ir viešai prieinamų rinkinių techninė analizė'. *Knygotyra* (2011), No. 56, pp. 85–111.; Rimvydas Laužikas – Ingrida Vosyliūtė, 'Kultūros paveldo ir lituanistinių mokslo duomenų skaitmeninimas Lietuvoje: 2011 metų situacija', *Informacijos mokslai,* (2012), No. 60, pp. 96–115.

In Lithuania it has evolved into a direction of common methodology and of digitization cultural heritage[12].

Factors of digital media transference in museums

Digital media theorist Lev Manovich claims that today's global culture embraces computerization, which changes many cultural layers. Unlike the part of the digital enthusiasts, who prophesized the death of old media – books, photographs or radio – L. Manovich believes that the rising "information aesthetics" (the new global informational society, which is different from the old industrial society) will follow an entirely different logic from the industrial modernism which attempt to erase everything old[13]. Therefore, according to L. Manovich it is a hybrid rather than a homogeneous.

Similar to M. McLuhan, L. Manovich claims that media revolution caused by the computers is deeper than the previous induced by the press and photography. In his opinion the appearance of press made the impact on only one cultural communication type – media distribution, appearance of photography – records of still images. Meanwhile, the emergence of the computer media affects all stages of communication, including the manipulation of data, its collection, storage and distribution. Furthermore, the media itself are affected – text, static and moving images, sound, and spatial constructions[14].

One of the most important changes caused by the digital media – the change of the museum concept: from the object centered to the visitor's experience centered institutions. Nina Simon's concept "Participatory Museum"[15] is based on the idea, that museum is an audience-centered institution where visitors are not passive observers, but active and sociable participants that construct the means by themselves from their own cultural experience. By developing this theory Dutch museologist Peter van Mensch identified three factors of museums' policy: the founders (the state or a private collector), the curators and the visitors[16]. According to him, earlier the first two (founders and creators) had greater power in forming of museums' policy and content. Meanwhile, nowadays the visitors have a growing influence on museums who became equal partners with other earlier-dominated museums' factors. In case of Lithuania, these tendencies are weaker due to faint use ICT in museum sector.

According to Ross Parry, the adaptation of ICT in museums was not a revolution "without blood," because it caused the new problems related to computer application in museum activities[17]. The following are the basic problems: failure to estimate resources and skills necessary for digitization, slow reaction of organizational structures, shortage of funds and planning.

In addition to these global factors, in Lithuania the researches identified these problematic ICT transference factors: sector and institutional infrastructure division, metadata, data, file formats, long-term conservation strategies, search protocols, standardization level, failure to understand the context of the operation of social infrastructure and unsolved legal issues (especially on protection of the intellectual property and personal data)[18].

Christine L. Borgman researched the transference of digital ICT in another memory institution – libraries. She says that although innovative ICT provide new methods and tools for the implementation of certain activities, but people often refuse from the old work habits[19]. Ch. L. Borgman recommends to use not the terms of evolution or revolution, but the terms of information technology, human behaviour and co- evolution of organizations[20]. According to her, people decide to use ICT, depending on their needs, but often in the same how was thought and planned by the technology creators.

Ch. Borgman proposes to distinguish between the technology adoption and adaptation. Social factors which cause the technology adoption are indicated in the theory "Diffusion of innovations"[21] by Everet Roggers. The first stage of the adoption is based on the knowledge that the certain new technology can be useful. This stage is determined by factors such as the experience from previous work, the tendencies to be innovative and individual social norms. The second phase is marked by the belief in the technology as a certain tool to facilitate the work. In the third stage the adaptor already chooses the decision to accept or reject the technology. Its adoption could lead to the fourth stage – its implementation and to the fifth stage, – the approval to continue its use, if the innovation appears effective.

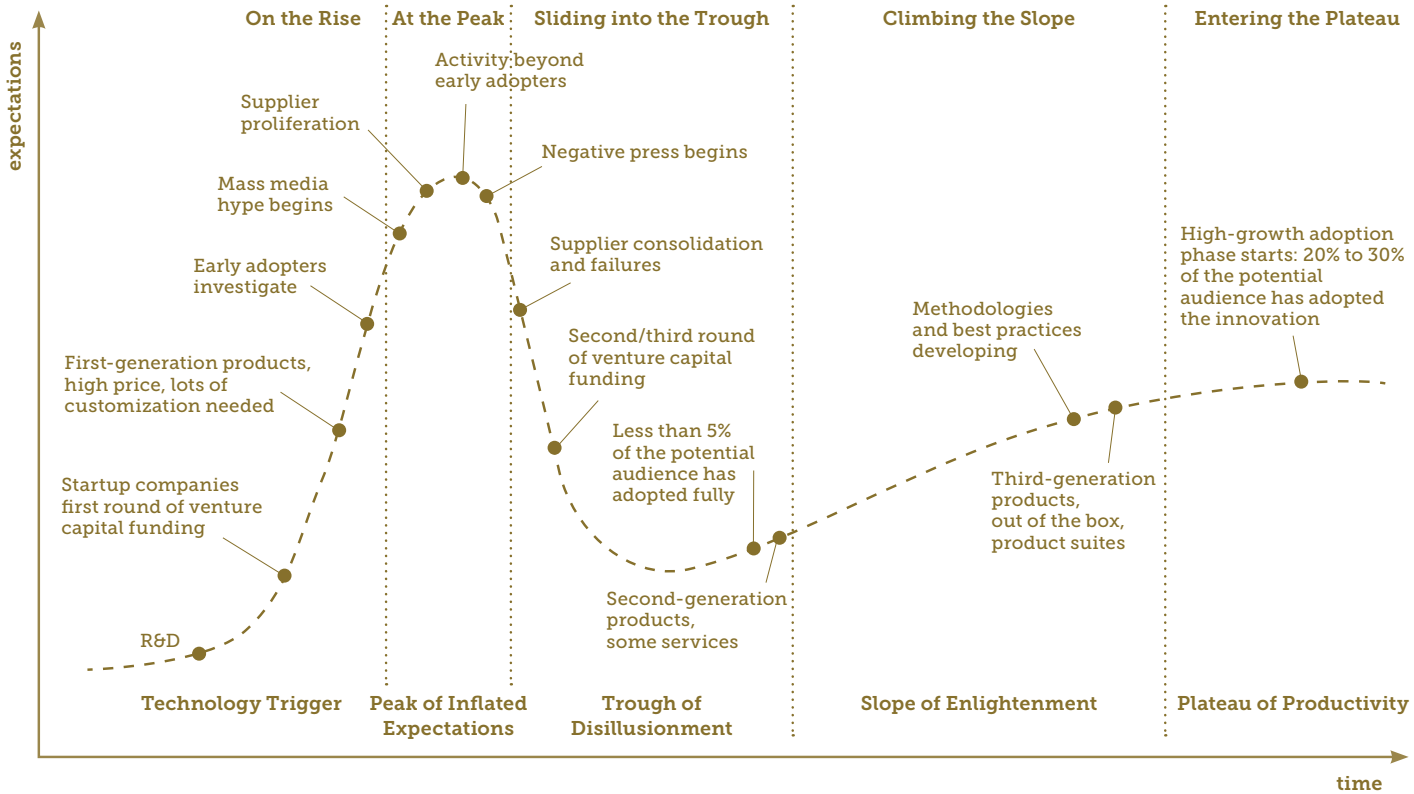
Speaking about the adoption of the digital technologies Ch. L. Borgman emphasizes that this action should be understood not as a binary decision (to accept / not to accept), but as more difficult process i.e. how the adopted technologies are adapted in time[22]. It is important to realize that even though the technology adoption and adaptation are attributed to individual choices, in cases of organizations, and especially government, the situation is different. In the case of the digital media adaptation in museums, more power lies within the museum as an organization rather than within the individual worker's choice.

In 1995 ICT research company "Gartner" have developed the "Hype cycle" methodology. It is used to predict and interpret the certain tendencies related to the technological innovation and adaptation over time. For example, to distinct the periods of the primary and basic technology adaptation and to reduce the risk of investment of business enterprises in still unclear field[23]. "Gartner" "Hype cycle" is constructed avoiding the technological determinism. It occurs from two different factors – human and innovation – natural interaction. Irrational human nature leads to the growing expectations. Meanwhile, the nature of technology is based on rationality – that as soon as someone creates some tangible economic value. The problem is that these factors are moving at different paces, and innovation rarely reaches such expectations that people hope[24]. The expectations grow rapidly and people become quickly disappointed in it, while innovation matures slowly in technical point of view, step by step. "Hype cycle" methodology claims that each technology is going through five main stages of adaptation *(Fig. 3)*.

Technology trigger begins when the innovation is first time publicly demonstrated and is put into operation or some event related to it causes the interest of media and business. In this period, innovation is still

[12] Regina Varnienė-Janssen, 'Metodologiniai ir organizaciniai kultūros paveldo skaitmeninimo ir bibliografinės sklaidos aspektai: lietuviškoji koncepcija', *Bibliografija: mokslo darbai, 2011,* pp. 102–113.
[13] Manovich, Ibid, p. 17.
[14] Manovich, Ibidem, p. 90.
[15] Nina Simon, *The Participatory Museum, (accessed 20/8/2013).*
[16] Peter van Mensch, *Museums and participation paradigm,* (accessed 23/8/2013).
[17] Ross Parry, *Recording the Museum: digital heritage and the technologies of change, (Museum Meanings),* Routledge 2007.
[18] Laužikas – Vosyliūtė, Ibid. pp. 96-115.
[19] Christine L. Borgman, *From Gutenberg to the Global Information Infrastructure: Access to Information in the Networked World,* 2000, p. 3- 4.
[20] Borgman, Ibidem.
[21] Everett M. Rogers, Diffusion of Innovations, New York, 2003.
[22] Borgman, Ibidem, p. 12
[23] *The Gartner research process and methodologies,* (last updated 2011, accessed 2013/08/12).
[24] Jackie Fenn - Mark Raskino, *Mastering the Hype Cycle: How to Choose the Right Innovation at the Right Time,* Harvard 2008, p. 26.

Fig. 3: The main stages of technology Hype cycle and digital media adaptation in Lithuania museums (1989–2013)



in the development phase, but the talks about its existence and possibilities go beyond the boundaries of the narrow inventors and developers circle. The introduction of the technology among its potential users causes new positive expectations, but commercial realization of the product in practice has not been tested yet.

The second phase of "Hype cycle", determined by mismatch of expectations and the actual technological potential is called **Peak of Inflated Expectations.** Media attention and the first stories of successful usage increase the fascination of the technology. Its products are highly priced because the technology suppliers try to compensate the expenses of the researches and development. In order to gain a competitive advantage, the aggressive organizations decide to try the technology. They co-work closely with the technology suppliers. More and more companies monitor how technology corresponds with their business strategies, but the majority of them do not participate in the technology adaptation process. The initial irrational fascination with the potential value of technology is declining. Problems arise with the operation of technology, the adaptation is slower than expected and failure to achieve the financial gain.

The mismatch of expectations and realistic possibilities causes **Trough of Disillusionment.** In this period problems arise when working with the first-generation products. Part of the early adaptations end in failures which are made public by the media. Disappointment period does not mean the complete collapse of technology. Some early adaptors benefit from the technology and overcome the first obstacles. They continue to move forward in the process of technology adaptation. These features are climbing to the **Slope of Enlightenment.** Over the time the innovation matures, because the suppliers improve the products using feedback and the good experience. To facilitate the adaptation appear the methodologies of successful use of technology. The technology reach early stages of maturity when second or third generation products are launched. Aggressive organizations after the implementation of the technology feel comfortable and conscious by controlling any adaptation problem. Meanwhile, less aggressive organizations initiate the pilot projects. Conservative companies remain cautious. In the beginning of this phase, the technology penetration is less than 5 % of the potential market.

It grows up to 20 % when technology enters the last phase of the "Hype cycle" – **Plateau of Productivity.** During this period, the technology benefit is already clearly understood. The technology feasibility and appropriateness clearly buy off. The mainstream adaptation begins. Depending on the nature of the innovation, the duration of "Hype cycle" varies from two years to few decades[25]. There are also dangers of "Hype cycle", such as premature technology adaptation, premature surrender to failure ("Trough of Disillusionment") and late adaptation.

"Hype cycle" methodology is used not only in the private business. It can also be applied to the public institutions or to organizations which adapt new technologies. Catherine Burton-Jones used the idea of this cycle by reviewing and interpreting the technical transformations of museums. She claims that today museums in the West are already in the Plateau of Productivity by the virtual exhibitions of educational programs and that

[25] *The Gartner research process and methodologies,* (last updated 2011, accessed 2013/08/12).

database of the collections available for new audiences of global visitors[26].

The beginning of "Hype cycle" – from "Technology trigger" to "Trough of Disillusionment": 1989-2003

Based on the statistics of the Ministry of Culture of the Republic of Lithuania (LRKM) in 2012[27] we can suggest that the process of digital media transference as an elementary binary (accept or reject?) in Lithuanian museums is the victory of "to accept". The vast majority of Lithuanian museums have their own web page, e-mail, participate in social networks. In addition to the traditional exhibitions there is a growing number of virtual exhibitions, digital publications, big part of museum visitors constitute of virtual guests, the museum collections' information system LIMIS is created, digitization of exhibits is active.

However, a research of the development of retrospective ICT transference in Lithuanian museums, in the context of "Hype cycle" model raises a number of questions. Did the Lithuanian museums experience the "Hype cycle"? At what its stage they are now? Does the investment risk in digital information systems no longer exist?

From a historical perspective, in accordance with certain qualitative features, these periods are visible *(Fig. 3).* To distinguish certain initial periods in accordance with only quantitative data is difficult, because official statistics of digital media installation in Lithuanian museums (web pages, e-mail, virtual users, virtual exhibitions, publications, etc.) the ministry of Culture started to collect periodically from 2001-2002, that is after the decade of the beginning of their installation and the potential Peak of Expectations. The non-official documents shows the situation, publications in professional press, interviews with the beginners of digital media in museums, and the computer program "Internet", archive wayback machine[28], that identifies the time of placement of the specific sites on the internet since 1996.

After the evaluation of the available documents, we can say that the first digital media adaptation period *(Fig. 3)* in 1989-2003. It can be divided into three sub-stages. The time limits of the chosen stages are more conditional, demonstrating rather a transition period and not a specific date of the changes.

Technology trigger (1989-1996)

The year 1989 can be considered as the beginning of the digitization in the Lithuanian museums. The pioneer of the implementation of the digital technologies or an aggressive organization, as it is defined by the "Gartner" methodology, become one of the largest national museums, Lithuanian Art Museum (LDM)[29]. It then acquired the first personal computer of type IBM PC / XT[30] and began to develop the digital collections management system based on MS-DOS software, called the Values of Art System of Lithuanian Art Museum (started functioning in 1991). Parallel digitization took place in Lithuanian libraries, where the foundations for the concept of digital Lithuanian Integrated Library Information System (LIBIS) appeared in 1994[31].

Reasons of digitization in Lithuania do not differ from the Western countries, which according to R. Parry, turned to computers in order to control more effectively the increasing flow of exhibits[32]. According to the initiator of the digitization in Lithuanian museums, LDM chief fund curator Loreta Meškelevičienė claims that the main reason which encouraged to create digital Lithuanian Art Museum value of art system was the desire to facilitate the work of personnel in the spheres accounting and exhibits security[33]. Human factors also played the important role in causing the technology trigger. Current LIMIS project director Danutė Mukienė says that LDM director Romuald Budrys as professional museologist was invited abroad to various institutions even in the Soviet period[34]. While being at the museum conference in the USA, he was familiarized with the digital museum databases and he was fascinated by it.

It should be noted the humanities and exact sciences representatives cooperation, informatics and mathematics participated in order to create LDM system, as well as consulting with the private company "Baltic Amadeus" which was one of the first ICT business in Lithuania.

The development of LDM digital system was held in isolation only with the part knowledge about other countries' use of the digital accounting systems in museums[35]. Changes took place in 1994-1995, when the members of Lithuanian museum computerization working group visited the Canadian Heritage Information Network (CHIN) organization. In Czech Republic, which was one of the leaders of the digitization of cultural heritage in Eastern and Central Europe, they familiarized with the computerized system of the cultural heritage protection "MacArt" (Macintosh Art collections), the computerized geographic System (GIS). In Moravian Land Museum, in the city of Brno, they familiarized with AISM (Automatizovany informatyčni system Muzei) – one of the first Eastern European museums automated information system for museums[36].

In the period of "Technology trigger" keeping with global tendencies, the first Lithuanian museum sites were created. The websites of the certain business companies attributed the first pages to the museums with the textual and visual information about the institutions their activities, services provided and protected values prepared by the museums[37]. The very first virtual exhibitions and the first news about digital media showed in the periodical publication museologists "LDM metraštis"[38]. About LDM experience of the technology adaptation could hear more local museums.

Peak of Inflated Expectations (1997-2001)

The beginning of this period is marked by the edition of the first legal recognition of digitization state-wide. In 1997 the Ministry

[26] Katherine Burton-Jones, 'The transformation of the Digital museum', in: P. F. Marty, K. Jones ed., *Museum informatics: people, information, and technology in museums,* New York London 2007, pp. 10.
[27] Lithuania museums statistics 2003–2012 available in http://www.muziejai.lt/statistika.htm (last updated 6/9/2013, accessed 2013/07/31).
[28] Internet archive wayback machine available in http://archive.org/web/web.php
[29] According to LRKM 2012 statistics: LDM had about 235 000 exhibits and 267 000 visitors.
[30] Loreta Meškelavičienė, 'Muziejaus rinkinių apskaitos kompiuterizavimas', *Lietuvos Dailės muziejus, Metraštis, 1 (1996),* pp. 163.
[31] Regina Varnienė-Janssen, *'Lietuvos kultūros paveldas atsiveria pasauliui: metodologiniai, technologiniai ir organizaciniai sprendimai',* Vilnius 2010, p. 268.
[32] Parry, Ibidem.
[33] Meškelevičienė, Ibidem, pp. 163.
[34] Ignas Kapleris interview with Danutė Mukienė, 2013.
[35] Meškelevičienė, Ibidem, pp. 165.
[36] Normantė Žekonienė, 'Čekijos ir Danijos muziejų kompiuterizavimo patirtis', *Lietuvos Dailės muziejus, Metraštis,* I (1996), pp. 166–169.
[37] Danutė Mukienė, 'Lietuvos muziejų skaitmeninių leidinių raida 1995–2010 metais', *Lietuvos Dailės muziejus, Metraštis,* 14 (2011), pp. 314– 315.
[38] For example: Loreta Meškelavičienė, 'Muziejaus rinkinių apskaitos kompiuterizavimas', *Lietuvos Dailės muziejus, Metraštis, 1 (1996), pp. 163–165.;* Normantė Žekonienė, 'Čekijos ir Danijos muziejų kompiuterizavimo patirtis', *Lietuvos Dailės muziejus, Metraštis,* I (1996), pp. 166–169.

of Culture approves the instructions of protection[39], accounting and storage of museum collections. It was recorded with the theoretical digital accounting possibilities of museum artefacts. However, it was more a symbolic step as it was continued by most museums: to record the exhibits using traditional tools i.e. exhibits original books and records of the inventory, receipt, transfer, and other acts filled in manual writing. The curator of the museums' sector of the Ministry of Culture from 1988 to 2011, Romanas Senapėdis argues that most of the museums stayed with a written accounting, so that the museums did not trust digital information in principle[40]. A written document looked to them more reliably protected against theft and counterfeiting.

According to R. Laužikas, one of the innovators of the implementation of digital technologies, said that the period of 1998-2002, the Lithuanian Association of Museums Collections accounting, security and storage section were led intensive discussions on the digital collections issues, it was presented the "good practice", but the most museums to the digitization watched carefully[41]. According to R. Senapėdis, part of the museums realized that the digitization is a difficult matter, and calmly watched the activity of the LDM. Until 2001 the database of the digital collections were implemented only by 3 out of 99 of the Lithuanian Museums[42].

In 1996-1998, Lithuania started to create the first autonomous websites (with their own URL)[43]. Greater encouragement for creating web sites was provided by the state financial resources and the support of high officials. With reference to the competition of the virtual exhibition of the millennium of Lithuanian cultural heritage, some Lithuanian museums virtual exhibitions or museum websites were created. Another important step was Open Lithuania Fund's financial assistance with George Soros, which enabled to create the Lithuanian museum portal. It was won by the LDM, the digital media innovator, which established the Digital Publications Division – the first among the Lithuanian museums.

During this period the cooperation continued between the museologists-humanitarians and with the exact sciences representatives, especially with Lithuanian Institute of Mathematics and Informatics, UNESCO Chair headed by L. Telksnys "Informatics for the Humanitarians", which was founded in 1994[44]. The main purpose of its activity was to open up the usage possibilities of the information technology for humanitarians and help to learn it.

The initiatives of the digitization pioneers in public space were visible. Approximately in 1999-2000, in the main periodical publication of country's museum workers "Muziejinkystės biuletenis", the articles concerning the computers were published for the first time[45]. Then, the digitization problems were discussed at the second Congress of the Lithuanian museum-workers[46]. This is yet another feature of the entry of the "Hype cycle" into expectations peak.

Most of the Lithuanian museum workers did not realize about the computer technical capabilities. R. Senapėdis claims that the museum workers wanted a lot, but honestly, the majority of them had not touched the computer[47]. Also there was a lack of support from the authorities – the digitization was traditionally understood as an activity not characteristic for the humanitarian and cultural sphere or even incomprehensible.

There was a lack of computers too. They were purchased by the museums or received as charity from the Western European countries. The majority of computers in the museums were used to edit the text or accountancy, as is it showed the research of the computerization situation in 2001[48].

2001 was the top of the "Peak of Inflated Expectations". It is reflected by the intensive actions, such as the development of the computerization concept of the Lithuanian museum collections of and the first wide analysis (97 Lithuanian museums participated – almost 100% of the museums existed) of the situation of the computer usage in the Lithuanian museums. The results showed that it was necessary to coordinate and accelerate the process of the computerization of the museums. The most important tool for achieving this purpose was to create a unified Lithuanian museum information system (LIMIS). This system had to connect in a single network all the Lithuanian museum collections accounting databases. Also the co-operation between memory institutions was planned. It should be noted that at the time, digital media transference in the Lithuanian libraries had already surpassed the transference in the museums. In 1998 LIBIS – sub-system was launched, which integrates main scientific libraries unified catalogue of the Lithuanian libraries, initiated by Lithuanian National M. Mažvydas Library[49].

According to D. Mukienė it was decided to create the museum information system on by the Lithuanian museum-workers themselves, rather than buying foreign product because the system re-arrangement and adaptation to well-established Lithuanian museum practices and traditions will cost more[50].

Trough of Disillusionment (2002-2003)

This period marks the pause in the field of the digital technology transference compared to the period before. LIMIS implementation works have stopped. In 2001 it was known that in order to successfully implement LIMIS, the computerization of Lithuanian museums must be included in strategic plans of the Ministry of Culture and find appropriate financing. In reality, these goals were not achieved, and not because of financial reasons. According to R. Senapėdis it was influenced by the certain human factors[51]. For example, the disagreement among the Heads of the Lithuanian museum and certain fear of the museum-workers, that their accumulated material will be used by someone else. Also, there was no understanding about the cultural heritage as the asset of whole Lithuania and not just a property of the individual museum. As well as the friction was among the museums on the priority of the technology adaptation.

[39] New instructions of care LRKM approved in 2005 m. These instructions, like their predecessors, said that the accounting of museums exhibits „must be written and can be computer made". Available in http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=268789 (accessed 2013/ 08/15)
[40] Ignas Kapleris interview with Romanas Senapėdis, 2013.
[41] Ignas Kapleris interview with Rimvydas. Laužikas, 2013.
[42] Loreta Meškelevičienė, 'Parengtas Lietuvos muziejų rinkinių kompiuterizavimo koncepcijos projektas', *Muziejininkystės biuletenis,* 5-6 (2001), pp. 6.
[43] Mukienė, Ibidem, pp. 315-316. According to the search by Internet archive wayback machine (http://archive.org/web/web.php) the websites of these 3 Lithuanian museums were fully available in 1999–2000.
[44] LDM cooperated with Lithuanian Institute of Mathematics and Informatics, UNESCO Chair in creation these heritage websites:(All Lithuania museums web portal) http://www.muziejai.lt/; (own LDM website) http://www.ldm.lt/index.htm; (Virtual exhibition of Lithuania culture millennium) http://alka.mch.mii.lt/ ir kt. (accessed 2013/08/25).
[45] For example: I. Miniotas, 'Lietuvos kultūros paveldas tūkstantmečio virtualioje parodoje', *Muziejininkystės biuletenis,* 1 (1999), pp. 14.; Danutė Mukienė, 'Virtualių muziejų portalas "Lietuvos muziejai', *Muziejininkystės biuletenis, 5 (1999),* pp. 6.; Danutė Mukienė, 'Lietuvos dailės muziejuje - Skaitmeninių leidinių informacinis kultūros centras-skaitykla', *Muziejininkystės biuletenis,* 3 (2000), pp. 8.; Danutė Mukienė, 'Naujos Lietuvos virtualių muziejų svetainės internete', *Muziejininkystės biuletenis,* 4 (2000).
[46] Rasa Maslauskienė, 'Kompiuterinio rinkinių katalogo kūrimo problemos', in: B. Salatkienė, ed., *Lietuvos muziejų rinkiniai. Tyrimų metodika. Konferencijos tezės ir pranešimai,* Vilnius 1999.
[47] Ignas Kapleris interview with Romanas Senapėdis, 2013.
[48] Loreta Meškelevičienė, 'Parengtas Lietuvos muziejų rinkinių kompiuterizavimo koncepcijos projektas', *Muziejininkystės biuletenis,* 5-6 (2001), pp. 6.
[49] Regina Varnienė-Janssen, *'Lietuvos kultūros paveldas atsiveria pasauliui: metodologiniai, technologiniai ir organizaciniai sprendimai',* Vilnius 2010, p. 274.
[50] Ignas Kapleris interview with Danutė Mukienė, 2013.
[51] Ignas Kapleris interview with Romanas Senapėdis, 2013.

Technology transference in the museums was also impeded by the passivity of the government institutions as well as lack of understanding of the importance of ICT application in the museums, the inability to legally legitimize, coordinate and find the financial resources for the digitization process. In this situation the Lithuanian Art Museum chose an independent path and collaborated with a private company ALNA, decided to create its own system of the collections' accounting RIS.

"Trough of Disillusionment" was witnessed by the first negative articles in professional periodicals of museum-workers at that time, emphasizing the problems to the application of digital technologies, such as failure of maintenance of the Web pages, private suppliers of digital technology and the public sector – customer relationship, shortage of funds in order to employ highly qualified professionals of computer equipment[52].

Absence of the digitization policy on state level resulted that the digital technologies adaptation was essentially left on its own and on the initiative of museums themselves. The museums according to their own needs and opportunities decided which technologies to acquire and how to apply them. During this period, the museum ICT transfer was financed mainly from scarce internal resources of the museums.

Slope of Enlightenment and the progression to the Plateau of Productivity in 2004-2013

According to the features distinguished in "Gartner" "Hype Cycle" methodology and to the available documents related to the digitization in Lithuania we can say that the Trough of Disappointment in this area ended in 2004. The second phase of digital media adaptation in Lithuanian museums began. It can be split into two sub-periods *(Fig. 3)*.

Slope of Enlightenment (2004-2009)

The country's accession to the European Union (EU) in 2004 marks an important turning point in the processes of the cultural heritage digitization related to its funding. The decisive role in this process is played by the EU Structural Funds. So far, Lithuania has experienced two EU funding programming periods: in 2004-2006 and in 2007-2013.

Common EU digitization policy and directives encouraged changes in the cultural policy of Lithuania. Firstly, the digitization of memory institutions policy appeared coordinated by the state. Primarily due to the state coordination, the digitization of the memory institutions policy was resulted. In 2001 "The Lithuanian Cultural Policy guidelines" and the "Lithuanian Concept of National Information Society Development" was defined by long-term preservation of the Lithuanian heritage, awareness and the use of the information technologies, but the problem in our country by the year 2005 has not been decided at the national level, in the coordination of memory institutions archives museums and libraries activities[53].

The digitization policy towards a specific legal basis. In 2005 Government of the Republic of Lithuania adopted a resolution on the approval of the Lithuanian information society development strategy for validation, and the same year resolution on the approval of the Lithuanian cultural heritage digitization concept. In this concept the criteria of the cultural heritage digitization selection were determined, goals and objectives were identified, and also the Digitization board to the Ministry of Culture was established. Changing the government's position on the digitization an important role was played by the Lithuanian National M. Mažvydo Library Digitization Center Director R. Varnienė-Janssen greatly contributed to the creation of legislation and approval. The created and validated documents ensured a particular public funding for the digitization of heritage, and after 2004 these purposes were benefited with the EU structural funds.

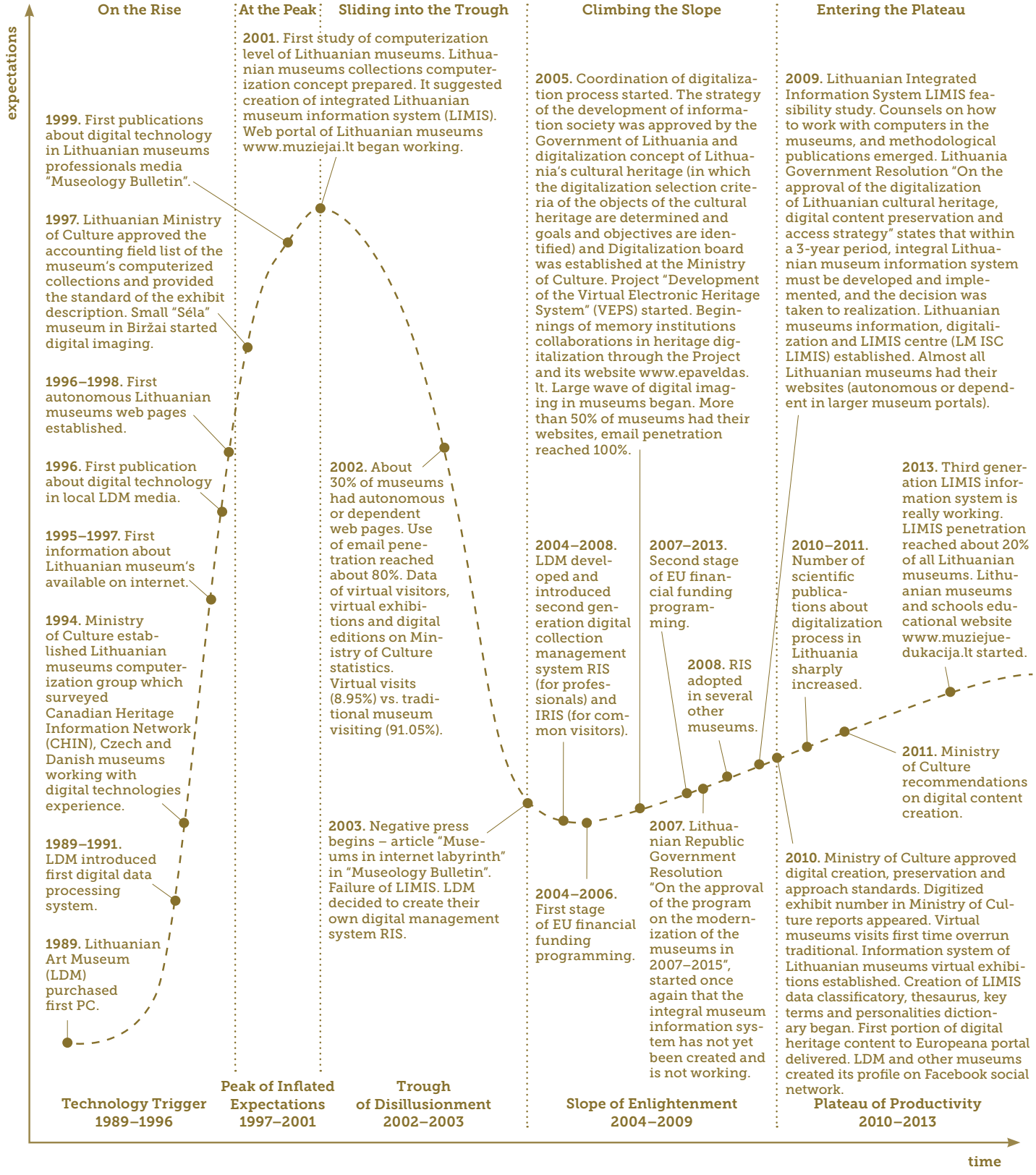
The initiative of the legalization of digitization was taken by the libraries which were further advanced in this area. In 2003 LIMIS development has stopped. Meanwhile already 50 national libraries participated in LIBIS cumulative catalogue[54]. According to R. Senapėdis libraries in the field of digitization were full head above the museums[55]. This was due to the unified system of standards, and the goal was not to mechanically digitize three-dimensional, and variously classified unique museum exhibits, but – books and newspapers. Furthermore, the Lithuanian museums system was more diverse and more complex than system of the libraries, which had a clear hierarchy, thus avoiding some friction between the institutions. For example, there was only one National Library but there were several national museums. Also librarianship had a strong scientific base. Its studies at Vilnius University were held continuously since 1949[56], therefore critical mass of top-level library professionals were familiar with the processes of digitizing at theoretical level and successfully applied this knowledge in practice. Meanwhile, the museum studies at Vilnius University, in the Faculty of History were held episodically during 1947-1950, and only since the year 2000 has been updated in the Faculty of Communication[57].

The cooperation of memory institutions have strengthened in the field of digitization. The results was the adoption of legislation acts, which formed a unified digitization methodology and particular works. The National Mažvydas Library together with the Lithuanian Art Museum and Archives Department began the implementation of the project "The Spread of the Virtual Electronic Heritage System" (VEPS). During its development the Lithuanian cultural heritage portal www.epaveldas.lt was created. Currently, in its database there are already over 3 million pages of extremely valuable old books, newspapers, works of art, manuscripts, church registers.

In the digitization process the Lithuanian Art Museum remained as a clear leader. In 2004 – 2008 LDM has created and implemented the Collection Information System (RIS) and the Integral Collection Information System (IRIS). They paved the way for LDM computerize records, gather and organize and manage data about museum collections, and to provide information to museologists. In 2008 RIS and IRIS were introduced and adopted by the State Gaon Jewish Museum and the National M. K. Čiurlionis museum. Collections accounting information systems were developed by the several other museums but they were not adapted for the miscellaneous digitization.

[49] Regina Varnienė-Janssen, *'Lietuvos kultūros paveldas atsiveria pasauliui: metodologiniai, technologiniai ir organizaciniai sprendimai'*, Vilnius 2010, p. 274.
[50] Ignas Kapleris interview with Danutė Mukienė, 2013.
[51] Ignas Kapleris interview with Romanas Senapėdis, 2013.
[52] Danutė Mukienė, 'Muziejai interneto informacijos labirintuose', *Muziejininkystės biuletenis,* 2 (2003).
[53] Varnienė-Janssen, Ibidem, p. 340.
[54] Varnienė-Janssen, Ibidem, p. 274.
[55] Ignas Kapleris interview with Romanas Senapėdis, 2013.
[56] *Bibliotekininkystės ir informacijos studijų vadovas,* Vilnius 2009, p. 32.
[57] Rimvydas Laužikas, 'Penki atsakyti klausimai apie muziejinkystės studijas Lietuvoje', *Lietuvos muziejai,* 4 (2009), pp. 6.

Fig. 4: The interface of operating Lithuanian integral museum information system (LIMIS) 2013



According to D. Mukienė the priority was given to accounting, since there was no need for promotion[58]. During the preparation of the RIS project some errors occurred. During the preparation of a possibility study, there was a lack of experience, and there was not enough evaluation for time costs to the works concerned with the scanning of art artefacts and image editing time the specifics of the works of art and quality problems of the written information of museum collections.[59]

The Resolution of the Government of Lithuanian Republic: "On the approval of the museums modernization of program in 2007-2015" stated once again, that LIMIS is not created and does not work. In 2009, the government of the Republic of Lithuania adopted the strategy of digitization of the Lithuanian cultural heritage, preservation of the digital content and access, and plan of its implementation by the year 2013. It specifies that within 3 years the Lithuanian integral museum information system should be created and implemented, and the decision was put into action. The LDM set up a new structural department of Lithuanian museums information, digitizing and LIMIS center, along with a LIMIS possibility study. D. Mukienė claims that the task of LIMIS centre was to form a closer cooperation between LDM and other museums in creating LIMIS.

In 2009, major turning point occurred in the field of the Internet. Most of the museums in Lithuania already had created independent sites, or sites that belonged to a larger portal as it is shown by the Ministry of Culture statistics[60]. The understanding to the need of the digitization and acquisition of "good experience" is confirmed by the first methodical means, which appeared and familiarized museologists to the digitization[61].

Productivity plateau (2010 – continues to this day)

Its beginning is marked by the Law of the Ministry of Culture on "For approval of the creation of digital content, storage and access standards and normative documents" in 2010. Also LIMIS, which started to function in 2013, now covers about 20% of the Lithuanian museums – 4 national museums and 15 state museums. Thus, with the technology reaching such a percentage, according to "Hype cycle" methodology, we can already state its position being in the sphere of productivity plateau. While developing LIMIS project, in its second phase, there are plans to install the system in 67 municipalities, in 22 departmental, private, and other museums, that operate in geographically remote regions. Working in this method should reduce the digital divide, caused by geographical and economic factors and should promote development processes of network society. On the other hand, Lithuanian museums are not in rush to open the digitized exhibits to public access. For example, in August of 2013, LIMIS database contained 129,562 digital objects and 355,618 exhibits, but only 10 738 objects and 8926 exhibits were presented for the public access[62].

J. Varnienė-Janssen says that the major achievement was the adoption of strategic documents of national culture heritage, which shall ensure successful strategic activities of national memory institutions and other agencies concerned with log-term preservation and Access of the national cultural heritage, and provide guarantee for sustainable financial support[63]. Today Lithuanian museums in the sphere of ICT transference face the new phase, of strategic planning, new cultural digitization strategy is being developed and the new injection of EU financing for the cultural heritage.

Conclusions

Based on the comparison of certain quality criteria and statistical data of ICT transference in Lithuania museums, we can suggest that the process of digital media adaptation in Lithuanian museums meets "Gartner's" "Hype cycle" and the longest technological adaptation in years.

While adapting technologies, the Lithuanian museums managed to avoid some of the pitfalls of "Hype cycle", such as premature ICT adaptation or adaptation delay because of failures. On the other hand, more than a decade of delay for creation of LIMIS, caused the fact, that more attention and efforts of the Lithuanian museums were devoted to their accountancy of their collections, i.e. their internal problems instead of improving communication with visitors, using ICT. Also it can be said that the current museum participation, when LIMIS ICT adaptation is in the period of Productivity plateau, is the least risky and especially favourable. Lithuanian museums now understand better the benefits of ICT and the returning value in social way. However, in the context of the emerging network society and rapidly evolving ICT, the new tendencies in museums communication become noticeable, associated with visitors wish to experiment themselves on a network or to provide their own information on it, to share emotions and to create virtual communities. There is a possibility that young generation, which will grow up in the environment of the computer games and the Internet, will give priority to Wikipedia or Youtube channels, instead of Europeana, an online museum Web pages, search systems, controlled by authority – curators. ■

Keywords:

Information and communication technologies (ICT), digital media, digitization, Lithuania museums, technology "Hype cycle"

Klíčová slova:

Informační a komunikační technologie (ICT), digitální média, digitalizace, litevská muzea, technologie „Hype cycle"

[58] Ignas Kapleris interview with Danutė Mukienė, 2013.
[59] Loreta Meškelevičienė, 'Rinkinių skaitmeninimas Lietuvos dailės muziejuje, *Lietuvos dailės muziejaus metraštis'*, 12 (2007), pp. 429.
[60] Lithuania museums statistics 2003–2012 available in http://www.muziejai.lt/statistika.htm (Accessed 2013/07/31).
[61] For example Rimvydas Laužikas, *'Kultūros paveldo skaitmeninimo ABC... DEFG...: mokomoji metodinė knyga'*, Vilnius 2009.; Muziejinių vertybių skaitmeninimas, D. Mukienė ed., Vilnius 2009.
[62] According to LIMIS statistics available in http://www.limis.lt/ (accessed 2/9/2013)
[63] Varnienė, Ibidem, p. 474.

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