

The Use of Digital Solutions in Museums Today and in the Future

Conceptual considerations through the lens of the Norwegian Government's Museum Framework

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In this paper we look at digital solutions in museums today and with a view to the future. We believe that they have a potential to innovate museum practices and reach audiences with relevant content. We have found the Norwegian Government's Museum Framework (Kulturdepartementet 2009) a useful starting point to consider 'digital' through the lens of the areas of collection care, research, content dissemination, innovation and business development. In this paper, our focus is on smaller museums and heritage organisations. We contribute our thoughts, experiences and give some practical ideas how small museums can better utilise digital media and digital solutions.

This paper was written by staff members of Museum Nord who are part of the Research and Development Team. Museum Nord was lead partner in the CINE project, 2017-2020 (CINE project 2017) which enabled the team to gain valuable insights into this area of knowledge and practice.

KEYWORDS

Digital heritage dissemination, collection care, research in museums, digital innovation in heritage, digital assets, Norwegian Museum Framework.

INTRODUCTION

In a world full of data, digital things become fleeting and obsolete while others stand out for longer. Museums are faced with serious questions on how to collect the present and the past for the future. What is important and what keeps? How do we use digital content well? Do we catalogue digital models in the same way as we catalogue an object in our collection? 'Digital' is embedded in all areas of life and in all areas of operating museums. It offers intelligent, low-price systems that can help make collections more accessible, disseminate content, and engage audiences in new ways.

It is useful to start exploring what we mean by 'digital'. The lexicographers of the Oxford English

Dictionary (OED 2020) have pointed to the term digital as a particular example of the changing use of language over time. In a relatively short period digital has developed from referring primarily to data stored as a series of digits to refer to a range of content accessed via computers and connected through the internet. Computers and the internet are so interwoven in our lives that it appears somewhat meaningless to consider digital as a separate category.

However, in the context of this paper there are certain characteristics of 'digital' that we should consider. If we turn to the business sector, we read that digital is "about technology. [It is also about] a new way of engaging with customers [and] it represents an entirely new way of doing business." (Dörner and Edelman 2015) In summary Dörner and Edelman state that "digital should be seen less as a thing and more a way of doing things." (Dörner and Edelman 2015) In this definition, digital is a means or a way of working.

In a Norwegian context the things that museums do are channelled through 4-5 development areas, called the Fs (see below). We will look at these areas through the lens of digital ways of working and highlight some of the challenges and opportunities that we can see. Our main leading question is: How can we use digital solutions to good effect in small museums and heritage organisations?

THE NORWEGIAN MUSEUM FRAMEWORK

The Norwegian Government has undertaken an extensive museum reform that was set in motion in the early noughties. Small museums were consolidated and brought together in larger units, creating around 60 national museums across Norway that receive annual state support. Along with new distributions of tasks in the administration of heritage and the stipulation of professional networks within the sector, the Government introduced a framework that guides the work of museums. The initial framework detailed four areas of development, namely Forvaltning [Collection Management], Forskning [Research], Formidling [Dissemination] and Fornyning [Innovation] (Kulturdepartementet 2009). In recent years an additional “F”, Forretning [Business Development], is sometimes added. It reflects the need for income generation through increased commercial activities. The Fs can be seen as a tool to

create excellence and to professionalise the sector.

FORVALTNING - COLLECTION MANAGEMENT AND CARE

The Norwegian Government writes: “The museums’ collections must be secured and preserved for posterity in the best possible way and made available to the public and for research.” (Kulturdepartementet 2009, author’s translation). Museums should focus on their collections by ensuring that they are preserved well and secure for the future. Each museum is encouraged to have a collection plan that explains both the strategic development of the collection as well as the measures taken to look after the collection (Kulturdepartementet 2009).

Digital possibilities in collection care can be divided into two main categories: possibilities connected to the digital tools for collection care and possibilities connected to digital or digitised materials in museum collections.

Today’s digital tools for collection care already provide a dramatic shift from the old manual systems to register objects, allowing for a better flow of information that is tightly connected to a particular object in the collection. The most used digital collection software among small Norwegian museums is the Spectrum-compliant Primus (KulturIT 2017). It was created in the mid-1990s and is still under con-

tinuous development. Primus entries create a database of all museum objects (photo, film, tape, physical objects and artwork) and their metadata such as objects entry, movement, loans, damage, conservation, insurance and use. These kinds of digital collection care tools help museums to look after collections better, to systematise them and to share knowledge with peers and users.

However, it takes a lot of time to register all the data manually. This could be eased through digital innovation in automating the registration process and using machine learning to scan and compare items. Babu has demonstrated how this technology can be used in the future on the example of the coin collection of the Ashmolean Museum (Babu 2020). While this is still in its infancy, other developments are advancing, for example the use of sensors on individual objects [Internet of Things] which can tell us about the conditions of the objects and their conservation needs (Alsuhly and Khattab 2018). Museums can help these developments by expressing their needs, by initiating such research or by offering to be partners in experimenting with such new technologies.

Digitisation has been practised for some time and has shown good results in easing access to materials stored in museum collections all over the world. While today digitisation is a time-consuming process

too, new tools are being developed to make scanning or photogrammetry for example more efficient. In some countries, museums cooperate to digitise their collections and agencies provide services to help the sector. Norwegian museums have received a unique opportunity recently to get their photo, video and audio collections digitised for free at the National Library's facilities in Mo i Rana (Nasjonalbiblioteket n.d.).

More and more museums use AR and VR models to visualise the past. They work together with IT developers to create models that can give the visitors an animated and immersive insight into how we imagine the past. This results in digitally created objects. The distinction between digital documentation materials and digital objects is important. Museums need good policies and guidelines to ensure that they identify digital objects as such and look after them appropriately. Fully digitised, scanned landscapes, data maps or virtual models fall into this category. As of today, we place little emphasis on these digital objects if they are not in use in an exhibition; and we often take lesser care, despite the fact that they are potentially more fragile than their physical counterparts. "Digital collections require active maintenance and will not survive passive storage." (Matters in Media Art project 2005) Looking after them requires both skills and a budget. The project Matters in Media Art pro-

vide useful practical information on this topic in relation to digital artwork which we see transferable to digital objects (Matters in Media Art project 2005).

From experience we know that those who are registering and looking after collections in small museums are often not people with a particular passion for digital innovation, but rather people who care for objects for their historic and material values. As museums we need to consider the skill sets of our staff and find a balance between traditional skills and different digital capabilities, that are essential to test, implement and utilise new technologies and communicate our needs to those who are developing them. There are many research projects led by universities that museums can join to gain additional skills and to become a place for experimentation and research in and of itself. The Education, Audiovisual and Cul-

What museums could do to enhance digital collection maintenance and care

- Include digital collections in the museum's collection policies
 - Think about the long-term storage of valuable digital items and budget for it
 - Contribute to research projects that usefully innovate collection care and maintenance practices
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ture Executive Agency of the European Union offers a partner search system where museums can communicate their interest in a specific funding strand, to name one of several such opportunities. (EACEA 2018).

Digital collection databases that cumulate collection data from many museums [e.g. DigitaltMuseum, Europeana] have enabled global access to collections. While these open and vast resources have value to researchers and specialists, we hope that better dissemination strategies will be developed in the future for more general audiences. Let us take a look at the "real world" analogue: no physical museum would display collections in a random way and let users make sense of their content; even museums who open their collection doors to the public usually offer guided tours. Without any form of genuine interpretation and curatorial guidance it is hard to imagine members of the public selecting and enjoying individual objects. Digital collections and digitised collections need careful curation to be of value for a general audience - just as physical collections do too. We see steps into new directions, Google Arts and Culture, for example, provides playful ways to curate content (Google Arts and Culture n.d.).

FORMIDLING - DISSEMINATION

Dissemination is one of the areas in which the digital appeared to have had most promise for heritage organisations. Digital brought a sense that access to museums no longer needed to be limited by their location and the number of visitors that could pass through their doors because the whole world was at their virtual door online. Digital had the potential to avoid some of the issues associated with physical access. These ideas have become even more prevalent during the Covid-19 pandemic.

However, dissemination is not so easy in the digital realm. “Digital isn’t about just working to deliver a one-off customer journey. It’s about implementing a cyclical dynamic where processes and capabilities are constantly evolving based on inputs from the customer, fostering ongoing product or service loyalty” (Dörner and Edelman 2015). While this quote is clearly borrowed from a business context, it can apply to museums as well. To be relevant museums need to understand their digital users and how they interact with their offers - ideally in the same way that large online department stores understand how to market their products in an individualised way on websites and in social media. We see today that museums use social media and web-analytics to good effect to build relationships and interact with specific communities. However, we would like to see museums actively and

strategically collect digital data from their users and combine them with external sources (e.g. tourism stats) to gain more insights. Museums need to create their digital offer based on the digital users’ needs, not on what they think is relevant.

Rebecca Carlsson (2020) argues that Big Data will play an important role in this regard and in the physical space too. “Until recently, the museum [that is the British Museum] had no easy way of finding out how people experience its exhibitions: what routes they take; what they engage with; how many minutes they take at each installation; which pieces they choose to ignore.” By means of such analysis we gain new curatorial tools to improve the heritage offer that we provide to our visitors - both physically and digitally. Today, we can place iBeacons and GPS-driven location technology in our museums and use them actively to both understand the visitor’s journey and offer content that is specific to the user. A hybrid museum connecting the physical and digital space adds new layers to a museum visit and can also invite visitors to interact with each other rather than the more traditional approach museum-to-visitor. An inspiring, creative example of this is the Gift Box project (Spence et al. 2019).

Creating high quality, engaging content for different user groups is not an easy task for museums, as it is both time consuming and can be expensive. In the

CINE project nine partners from different countries tested different free and easy to use technologies for the heritage sector. With the help of multimedia companies and universities who were able to adapt some of these technologies, the museums created multiple types of digital content from exhibitions to virtual models, apps and games. The learning from this process was shared on sites such as CINE Gate (2017), CINE Communities (2020) and the CINE Wayfinder (2020). In conclusion the museum partners found it useful to employ existing technologies either in house, or develop new technologies with the help of IT specialists. Equally, the Covid-19 pandemic has shown us that meeting online and organising events digitally is doable. Gathering experts and audiences from all over the world to discuss specific topics in one shared digital space is both possible and valuable.

We believe that museums need to be openly innovative and creative without losing sight of the quality

What museums could do to enhance digital dissemination

- Understand the digital users and define target groups
 - Take courage to do things differently and learn new skills
 - Analyse and interpret digital data
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of the content and the story they want to tell. Also, here, we conclude that museum staff need skill-sets to utilise the possibilities that are accessible to us, from design to digital storytelling to data analysis.

FORSKNING - RESEARCH

Research is a central part of the work that goes on in Norwegian museums. “Research and knowledge creation are the professional basis for collecting, documenting and disseminating content at museums. The goal is to increase research collaboration, both in the museum network, and between museums and research organisations.” (Kulturdepartementet 2009, author’s translation) states the Norwegian Government.

At Museum Nord, we have defined that “knowledge is always the foundation of what we convey to our audience - that is at the core of being a museum that is understood to be credible. We have a great need for knowledge within our strategic focus areas, and our major development projects. It is also the knowledge about our collections, and the history that they represent, that give us the means for collaboration in a larger professional community.” (Vermehren 2020) Museum Nord is not a research organisation as such but an organisation that accumulates and creates knowledge. The organisation utilises research to increase the quality of its content.

The digital revolution has changed the ways we research and learn (Smith n.d.). Before the invention of the internet, we visited archives, libraries and museums to undertake research. Today, we can sit at home and look at global resources that are available across different platforms - from literature, images, objects to large data sets, and we can compare them easily. This is an invaluable opportunity to gain new skills and to bring researchers into the museum. While ‘open-source’ and ‘open-access’ are the keywords of our time, it is important to remember that open data does not necessarily imply that historical narratives have become more democratic or that power structures can be disregarded.

With good googling skills - and, by the way, Chakraborty rightly points out that googling is a highly underestimated skill (Chakraborty n.d.) - anyone should be able to find research that is relevant to their subject or area of interest. Searching for knowledge provides several opportunities - it provides inspiration for new thought, it offers extensions to existing knowledge, it brings us to the researchers who we can follow on social media or invite to our digital events, and it leads us to other organisations that we can collaborate with. Research can be a real driver of innovation. We believe that all museums, whether big or small, can utilise research to good effect.

On the downside, if you have a good idea and you

start looking for it online, you will probably see that someone else has had the same idea and is already working on it. Our advice is then to go offline, and to focus on your organisational needs, and your vision, and to create a project that works for you. Connect again and find the right people and funders to realise the project.

What museums could do to enhance research with digital means

- Make time for researching what others think and offer
- Go global: listen to researchers on your topic around the world, and invite them to your digital event & stay local: organise a small local group to listen to your global experts and create a valuable, social learning experience
- Recognise that your museum or the community group you are working with holds valuable knowledge - share it sensibly and well-referenced.

FORRETNING - BUSINESS DEVELOPMENT

Nowadays, museums need to run a business. Even though state support still provides a certain level of core funding for the majority of museums in Europe,

this support is decreasing. For some, it is already close to nothing and own income generation is a necessity. The standard activities for income generation are shops, cafés and taking admission for exhibitions. This activity has beneficial side effects - it enlarges the offer for the visitor and creates jobs in local communities. However, it means that museums need to increase their business expertise on various levels, such as finance, staffing, leadership, marketing and administration. Similar to digital skills, these are not traditional 'museum' skills. Some argue that this sidestep takes focus away from the core tasks and responsibilities of the museum operation (and one could argue similarly for the need for digital skills).

We want to look at the business-mindedness of the modern museum in a positive light. It enables an interdisciplinary dialogue within the organisation, and a new understanding of the visitor as a customer. We have started to treat those who visit us not just as knowledge hungry guests, but also as paying supporters. It is a service we are providing, and the more money we want to generate the better the service needs to be. Anno Museum in Southern Norway, for example, have analysed their customer journey to enhance the museum offer by including different income generating elements. They summarise that by doing so, they also created a 'better' museum (Anno Museum 2016). At a minimum, museums should

invest in easy-to-use web-shops and digital booking systems and integrate them fully into their digital offer. Both in the physical as well as in the digital world, it is important to make it easy for customers to pay.

Within the discourse around the digitisation of objects and the digital offer that museums are expected to have, is an untapped potential for income generation. Many people who visit our websites will never enter our museum. If we can provide an outstanding service to them digitally, they might be willing to pay for the knowledge, the resources or the curated experiences we offer. This can be achieved by offering basic functions to the public for free, and premium packages or extra bonus features for paying members or users.

What we need to get better at is to curate the visitor journey online, and to offer products that the customers are willing to pay for. In a physical museum we have someone greeting us from behind the desk, we have text and visuals that lead us through an exhibition or a guide to show us around a historic place and lead us into the museum shop or cafe afterwards. In a digital realm this is much more problematic - we are led by algorithms, marketing campaigns and lastly our own decisions on where to click. With a solid data analysis on who our customers are and external expertise on how to market the digital jour-

neys we create, we should be able to make an income while innovating what we do. To implement such structures successfully, IT specialists and marketing specialists need to join our teams.

Within the CINE project we moved several events online and built an audience who was interested in virtually travelling to different places and being shown around by experts. Some of these events included switching between life streaming of a specific place and entering a digital model of that same place in the past, for example at Skriðuklaustur in Iceland (Open Virtual Worlds 2020). This technique of layering visual information enhances the understanding of place in time and is an added feature that people could pay for. During Covid-19 lockdown in the Spring of 2019 the Faroe Islands were completely closed for tourism. The tourist board reacted quickly and created simple guided tours so that people could visit remotely. (Visit Faroe Islands 2020) While these were offered completely for free, they had features that could be sold, for example that of remotely steering the real-life guide in the terrain and letting him or her hop up and down by the click of a button.

'Digital' is probably most advanced in museums in the field of running the operation. Most of us are office workers that spend much of our time in front of screens (Misulonas, n.d.) for communication purposes, planning, task management, financial man-

agement, data management and marketing. Our operating systems are progressing and offering us more and more tools for daily tasks. However, there are few tools that can perform very specific museum tasks. By investing money to work with IT specialists, museums can create specific tools or software that bridges certain functions between existing programmes that can help to care for objects, analyse content or feed data into databases. Some of these specific ideas are already mentioned above. This sort of development can be a time saver, reducing costs or freeing resources for other tasks.

What museums could do to create income through digital means

- Understand your customers and audiences, and their needs and make content relevant
 - Create excellent digital content that has a value to your target audiences and let these audiences value it too by paying money for it.
 - Create digital events with special value
 - Invest in your web-shop and digital booking systems and make paying easy for your customers
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FORNYING - RENEWAL & INNOVATION

We often come across the idea that digital technologies will innovate the museum sector (and other areas of culture) through new software and hardware developments. We all adapt to new technologies and this process influences how we work and how we offer content to the public. It is a process of change and adaptation, but not necessarily a process of concrete innovation. A danger of this process is that we often recreate the analog versions of our museums in a digital format. Working in analog is what we are used to doing. Therefore, we often see that museums digitise objects, allocate metadata to them and put them into a digital collection or create a digital exhibition in ways that mirrors how visitors are expected to engage in the analog versions. The YIVO Bruce and Francesca Cernia Slovin Online Museum - An Interactive Journey through Jewish History of Eastern Europe (YIVO n.d.) is a good example of a very carefully curated, designed, interactive, educational exhibition that is similar to a museum visit where the visitor can walk from place to place, discovering parts of a story. Such exhibition makes knowledge globally accessible. We would like to suggest that there is much more that can be done. While we have only started to grasp the potential of digital tools beyond what the real-world analog versions offer we want to give some examples. In the CINE project we have discussed different inno-

vation ideas in workshops and meetings that can be summarized in four ways.

Firstly, digital technologies have the potential to bring together things that exist physically in different places and times. This enables us to layer information and content and make different datasets visible simultaneously. This can, for example, be achieved through mapping a landscape and layering climate change data and pollen analysis data sets over it. This can then be presented on a touring app for those who are visiting the landscape. The Strath of Kildonan case study provided a testing ground for this type of innovation (Timespan 2020).

Secondly, we see that virtual models can be an arena for historical and archaeological publication. Placing information in virtual models can illustrate arguments or possibilities in the quest to find out what might have been. For example, a virtual model can illustrate why certain assumptions such as roof structures and heights of excavated buildings are more likely than others. Creating a model enables us to think about structures in ways that we might otherwise not consider.

Thirdly, we see potential in creating online experiences that disrupt the real, or the imagined past in order to ask questions and to prompt the user to think or act. These experiences might become the paid museum visit of the future. Museums could work

increasingly with digital artists and gamers to create such environments. In line with Ed Rodley (Rodley 2020), we believe that the gaming industry has a lot of inspiration to offer to innovate this field.

And fourthly, we have been looking for a specific digital heritage discourse. The field of digital cultural heritage, in its many manifestations, is often approached with excitement about the novelty and innovation of the field. Much work being done in the field is applied and case-study based. While this has led to some interesting projects, it can be difficult to see the wider benefits of such time-restricted projects because so many seem to lack either a sense of being built on a theoretical underpinning or of contributing to a wider theoretical discourse (Clements 2019). Clements argues that, to fill this gap, we require a strong theoretical foundation; “creating a digital cultural heritage theoretical discourse requires identifying what it is that is unique about digital cultural heritage beyond simply its manifestation in the digital realm. What is it about the digital that makes digital cultural heritage unique and special?” (Clements 2019)

These ideas have made us aware that there are many research needs and opportunities that emerge in the interstice between museums and technology innovators. Strategic collaborations between cultural institutions, universities and technology developers can aid this type of development. “The future belongs

to those who can imagine it, design it, and execute it. It isn’t something you await, but rather create” says HH Sheikh Mohammed Bin Rashid Al Maktoum, Vice President of the United Arab Emirates and Ruler of Dubai (Dubai Future Foundation 2020). The art of ‘visioning’ is an essential exercise in the renewal of our practices.

The Norwegian Government suggests that “through professional development, innovation and professionalisation, museums must be up-to-date and relevant in all parts of their activities, be robust institutions and play an active role in society. A sub-goal is to develop digital management and dissemination.” (Kulturdepartementet 2009, author’s translation)

The reference to the digital in the formulation of the sub-goal resonates with the prominence of digital technology in the wider cultural discourse around innovation. It is commendable that the Norwegian Government’s conceptualisation of “fornying” sets innovation among the need for museums to be relevant, “robust” and active. There’s something about this juxtaposition in the context of the complex relationship between digital innovation and social responsibility that we have seen played out in broader society over recent years. It is the confidence that large digital technology players, such as Google, Amazon, Facebook and the likes, have the ability to provide us

with solutions to social, economic and environmental challenges (see for example Gerard, Merrill, and Schillebeeckx 2020). This view has remained largely unchallenged, notwithstanding widespread acknowledgement of some of the problems caused by digital technologies created in a culture of innovation which has been summed up in the Zuckerberg imperative “move fast and break things” (Taneja 2019).

What museums could do to innovate

- Understand the potential of digital tools and use them according to what you want to renew.
 - Make time for visioning exercises and be clear on your goals to achieve your aims
 - Create visions together with others for example, together with another small museum on the other side of the world, with similar specialisms.
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It is therefore timely to ask the question “how can small museums and heritage organizations innovate well in the digital sphere?” We would suggest that the first step is to reiterate the need to consider ‘digital’ holistically together with all other activities, organisational functions and the social responsibility that museums have. This should allow us to consider the

digital as a tool to achieve innovations in other areas, rather than being innovative in and of itself.

Secondly, we would argue that we need to recognise small organizations as ideal sources of innovation. This is a consequence of the holistic understanding of the organisational systems that occurs when just a few members hold responsibility for all its functions. That being said, museums require more resources (NEMO and Szogs 2020), both in terms of finance as well as capacity, knowledge of the possibilities of digital technologies, services and platforms, access to good research and information, and a culture of sharing self-reflective practice within the sector.

Thirdly, having recognized our own organizations as places of innovation, we would suggest that small museums and heritage organizations can innovate well in the digital sphere by recognizing other innovative local or global partners with positive attitudes and good ethics. An inspiring article on how this can be achieved can be found at the Victoria and Albert Museum Blog (Price 2014).

CONCLUSION

We want to turn back to our initial question ‘how can museums use digital to good effect?’.

Digital is a complicated matter. On the one hand we need to stop thinking about it as a separate entity

A sketch of innovation potential in the museum sector

	Task	Commonly used digital means	Innovation potential
Forvaltning	Look after collections Digitise collections Connect digital collections	Data-driven recording systems Photogrammetry API services	Internet of things, machine learning, cybersecurity, bulk digitisation, Big Data
Formidling	Making content available Creating experiences Creating events programmes	SoMe, website VR/AR, animation, gaming Zoom / webinars et.al.	Clever platforms, seamless digital experiences, hybrid events with local audiences and global experts, co-creation and participative storytelling, intelligent layering of data
Forskning	Create research questions Research historical topics Publication	Googling skills Data driven platforms allow for comparability mapping	Use digital models as medium for discussion and publication
Forretning	Design customer journeys Income generation	Paywall Online shop	Use added value principles to offer content

as it is integrated into all our lives; on the other, we need to harness its potential as a medium or tool for what we want to achieve. Therefore, we need to be specific about how digital helps us to extend and develop our practice, specifically in view of the users’

needs.

In the area of collection care we would like to see more developments towards automatization. Time consuming tasks, such as registration and digitalization, could be done more effectively; and valuable

time could be spent on other tasks instead, such as disseminating content and interacting with the visitors and users. Museums need to better understand the users' needs. Collecting, analysing and interpreting user-data intelligently would provide means to give people the specific content that is relevant to them, and to give them opportunities to share their own story, or to offer them interesting products such as personalized guided tours or local crafts connected to their interests from the online-shop. There are untapped possibilities for offering people added value through exceptional online experiences or services that use digital means to interpret layers of historical information across time that could also provide income for the museums.

Small museums are important agents in research. On the one hand, their knowledge, information and data can be the object of research; on the other hand museums provide a wealth of expertise that is relevant in many interdisciplinary research arenas. International cooperation projects such as CINE demonstrate this.

If we keep our eyes open and look at other sectors and how trends are developing in digital innovations (e.g. how the big corporations slowly transition, make new tools accessible, build business concepts into our ways of working) we can better understand how to build digital innovation into our vision for the future.

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