The Big Picture Model of digital preservation

How preservation policy, cost and infrastructure together shape long-term digital accessibility

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Introduction

As more and more collections curated by archives, libraries, media, museums and research centres are made available on-line in digital form, there is a growing need for ensuring that they remain accessible in the long term. This is a big ask for the responsible heritage organisations, which need not just expertise, but a combination of crucial factors such as qualified staff, infrastructure and budgets. The Dutch Digital Heritage Network (NDE) has designed a model that can help curators of digital collections get to grips with all the important aspects in decision making related to digital preservation. This model is called the Big Picture Model of digital preservation.

The Big Picture Model is the result of three separate NDE projects. Firstly, preservation policy has long been a special field of interest for the NDE. This has fuelled the development of a tool known as the 'Guide to Preservation Policy'.

Secondly, the NDE performs a great deal of research into the use of infrastructural solitions by heritage organisations. And research into the way in which heritage organisations implement digital archival systems and other tools for ensuring that digital information remains accessible in the long term.

Important factors in this research are are whether opportunities exist for sharing infrastructure and tools and, if so, how this can be done. Finally, the NDE has devised a cost model for calculating the cost of preserving digital information. The new Big Picture model now brings together these three separate strands, i.e. policy, infrastructural solutions and cost.

The NDE's dream is to foster collaboration among heritage organisations. The network was established in order to enable the heritage industry to develop a system of national facilities and services for improving the visibility, usability and preservability of the country's digital heritage. An important aim is to develop facilities and tools that can help heritage organisations do their work even better.

We hope that, armed with the Big Picture Model, heritage organisations will now find it easier to make smart choices. It's not a matter of telling other people what to do; it's all about members of the network helping each other.

Digital preservation and cost

The aim of the NDE is to improve the visibility, usability and preservability of the digital heritage, and it is with this in mind that we are developing a system of national facilities and services. We want to ensure that as many Dutch heritage organisations as possible can make use of these facilities and services. The facilities are intended to assist organisations to improve access to heritage information – for example, by employing common standards. They also help to improve the long-term preservation of the heritage. In short, the facilities help heritage organisations with their operational management.

Our use of the term 'digital preservation' in this article is based on the definition given in the Digital Preservation Handbook: "*all of the actions required to maintain access to digital materials beyond the limits of media failure or technological and organisational change.*"[1]

When people first started to think about digital preservation in the 1990s, the cost issue soon raised its head. Those responsible for preserving physical collections were already familiar with the cost aspect, but there was no clear understanding at first of the cost of preserving digital material: "*If we are effectively to preserve for future generations the portion of this rapidly expanding corpus of information in digital form that represents our cultural record, we need to understand the costs of doing so,*" wrote Garrett and Waters in one of the first reports on digital preservation, published in 1996.[2] And so it was that cost acquired a permanent place in the list of issues surrounding digital preservation.

Publications on the cost issue soon followed, as experts tried to break it down into its component parts, i.e. cost indicators. The first analysis of *cost indicators* was published by Hendley[3] in 1988. His model was based on the need to preserve different types of materials, all of which came with their own complexities and expected actions – the assumption being that a collection of digital images is a different kettle of fish from a set of Microsoft Office files. In each case, the need for preservation requires different measures – and hence comes with a different level of cost.

The OAIS[4] reference model was published in 2002, and when it has been the gold standard for organising digital archives since. The OAIS model includes a functional model for describing the functions that a digital archive is required to perform, and the cost models designed to date have been based on the functions described in this model. Ideally, every archive should include the following functions: ingest, administration, archival storage, preservation planning, access and data management. This simplifies the process of allocating the costs involved in maintaining the archive.

A range of cost models have been produced in recent years. The experts who drew up many of these based their calculations on the activities they expected would be necessitated by digital preservation. This involved 'translating' the functions in the OAIS model into a detailed list of activities for each function, thus enabling the costs to be clearly linked to a specific activity. This is known as activity-

[1] https://www.dpconline.org/handbook/glossary#D
[2] Report of the Task Force on Archiving of Digital Information, 1996. https://clir.wordpress.clir.org/wp-content/uploads/sites/6/pub63watersgarrett.pdf
[3] http://www.ukoln.ac.uk/services/elib/papers/tavistock/hendley/hendley.html
[4] ISO 14721 https://www.iso.org/standard/57284.html

based costing. Among the detailed activities included in this form of costing are those involved in selection, the individual aspects of the ingest process, the metadata process, preservation actions etc.

In practice, however, many heritage organisations use different operating procedures, based on the lump-sum method. This involves allocating a fixed sum of money to individual departments, without breaking it down into separate activities, thus making it hard to keep track of the cost of each individual activity. As a result, not only do the organisations in question not have access to sufficient information to be able to control the process of digital preservation, it is also harder for them to take strategic decisions.

In 2010, the *Blue Ribbon Task Force on Sustainable Digital Preservation* and Access[5] took an economic view of digital preservation, concluding that curators need to meet certain structural challenges:

- the long period during which the material needs to be preserved;
- the lack of clarity about who is responsible for what;
- the weakness of the arguments cited by heritage organisations in support of their plans;
- the murky group of stakeholders, who also include a large number of free-riders in their ranks, i.e. people who benefit from the efforts of others without paying for them.

The Task Force introduced the concept of 'value' in parallel with this list of challenges: "*When making the case for preservation, make the case for use.*" In other words, the first step involves analysing the users and their needs in relation to digital collections – including the time horizon.

Having set our sights on ensuring that Dutch heritage organisations reach the biggest possible audience, we (i.e. the NDE) no longer need to take account of the free-rider problem. However, in order to budget for specific activities, we do need to know the precise distribution of roles, i.e. who is responsible for what in the network. And we also need to know how much money each role involves. Information on cost is absolutely crucial, as is the concept of the 'value' of a collection.

Many heritage organisations implicitly place a figure on the 'value' of their collection. After all, their preservation policy describes not only how they wish to preserve their digital collection in the long term, but also what period of time they have in mind. The organisation's selection process is the first step in the process of valuing the collection. The effort it wishes to make in preserving the collection in the long term is the next step.

In 2010, a number of cost models were analysed as part of the 4C project.[6] The aim was to develop a generic model for costing digital preservation. The project involved analysing a dozen or so cost models, and the project team set out their vision for 2020 in the form of a road map: "*It will be easier to design or procure more cost-effective and efficient digital curation services.*"

Cost is just one aspect of managing digital preservation; many other aspects are also involved. The most important of these are policy and potential (technical) solutions. Together, they form the Big Picture of digital preservation.

[5] https://blueribbontaskforce.sdsc.edu/biblio/BRTF_Final_Report.pdf
[6] 4C, 2015, Investing in Curation; A Shared Path to Sustainability, 20 February 2015, pp. 1-26. http://www.4cproject.eu

Three elements: preservation policy, solutions and cost

The Big Picture of digital preservation is made up of the following components: preservation policy and basic principles, solutions and cost. They are all interconnected; each one of them affects the others.

Everything starts with the organisation's policy on digital preservation. In principle, every organisation that is responsible for a digital collection has a preservation policy. It knows how it wishes to safeguard access to its collection in the long term. It decides how and where it wishes to store its collections, and what quality standards it wishes to meet in doing so. It decides on how to achieve its objectives by opting for one or more solutions. This means, for example, deciding whether to perform certain activities itself, outsource them to an external service-provider or form partnerships with other organisations. All these options involve certain costs, which are the result of the choices made in terms of policy and practice.

In other words, there is a clear correlation between the objectives of an organisation's policy on digital preservation, the solutions it decides to adopt and the associated costs. Opting for a relatively cheap solution can affect the organisation's ability to achieve its objectives. The nature of this interrelationship forms the subject of the remainder of this article, which goes into the Big Picture model.

Policy

The policy on digital preservation, referred to in the remainder of this article more simply as the 'preservation policy', describes the method chosen by the organisation for ensuring that its digital collection remains accessible in the long term. Apart from reflecting the organisation's mission and long-term vision, this method also needs to take account of the more general operating environment, including legislation, as well as of internal documents such as policies on collections and information. Together, these are referred to in the Big Picture model as the 'basic principles'.

Formulating a preservation policy is no child's play. A huge number of aspects play a role in the long-term preservation of digital information. We have produced a 'guide to preservation policy[7] to help heritage organisations commit their preservation policy to writing.
The presence of a preservation policy is essential for staff. It helps them to deal with the digital collection on a day-to-day basis and acts as a guide to their working practices. It is also a useful tool for depositors, grant-providers, users and the general public, all of whom call organisations to account for the way in which they preserve their digital collections for future use. In short, a preservation policy is more than just an internal document. It also has a bearing on an organisation's relationships with other actors, which is why it is usually posted on the organisation's website.

[7] https://wegwijzerduurzaamheidsbeleid.nl/

The team behind the European SCAPE project have developed a *Policy Framework*[8] based on the principles underlying the OAIS standard, the certification requirements set out in ISO standard 16363 and many different publications on preservation policies. The Policy Framework lists ten 'key policy areas' as forming the core of a preservation policy; organisations can then formulate a detailed policy based on these ten key areas. The Policy Framework goes into each of these areas, discussing its role and significance. These descriptions are fairly general and apply to all types of collections. The planned approach is described in the information given under each heading. Organisations can use this information to formulate more detailed policies, for example on each individual collection curated by them. These policies must be couched in plain language, so that staff and other stakeholders can understand the organisation's approach. Consistency is also vital: the policy must be aligned with the organisation's mission, long-term vision and other policies.

A preservation policy should include the following aspects as a minimum requirement: authenticity, bit preservation, functional preservation, digital object, rights, organisation, access, metadata, standards, and audit and certification. Not all of these are immediately relevant to every organisation. The important thing is to be realistic, to take account of the organisation's maturity when it comes to the curation of digital collections, and to constantly adjust the preservation policy so that it is attuned to the organisation's current status.

Alongside any other policy documents that may be in circulation, the preservation policy forms part of the basic principles in the Big Picture model. This is explained in more detail in the following sections.

Solutions[9]

In 2015, the Dutch National Digital Preservation Coalition (now restyled as the DDHN's Preservation Programme) designed a model for analysing the infrastructure required to safeguard the long-term accessibility of digital collections in the Netherlands. The aim of the model is to identify opportunities for forging partnerships in relation to the technical infrastructure, both within and beyond the network.

As we have already indicated, the word 'solutions' is the term we use for the technical infrastructure required for preserving digital collections. The term encompasses more than just the technical facilities used for curating digital information, and also covers organisation and resources. We have incorporated a simplified version of this model (commonly known as the 'building block model') in the Big Picture model. The complex subject matter has been reduced to the following three components: organisation, technology and resources. These are the same components as make up the 'Three-Legged Stool for Digital Preservation'[10]. One extra component, i.e. basic principles, has been added to these for the purpose of the Big Picture model. This is because the basic principles form the foundations on which the other components are built.

[8] https://scape-project.eu/deliverable/d13-2-catalogue-of-preservation-policy-elements
[9] https://www.netwerkdigitaalerfgoed.nl/kennis-en-voorzieningen/digitaal-erfgoed-houdbaar/gemeenschappelijke-voorzieningen/
[10] See: https://deepblue.lib.umich.edu/bitstream/handle/2027.42/60441/McGovern-Digital_Decade.html?sequence=4

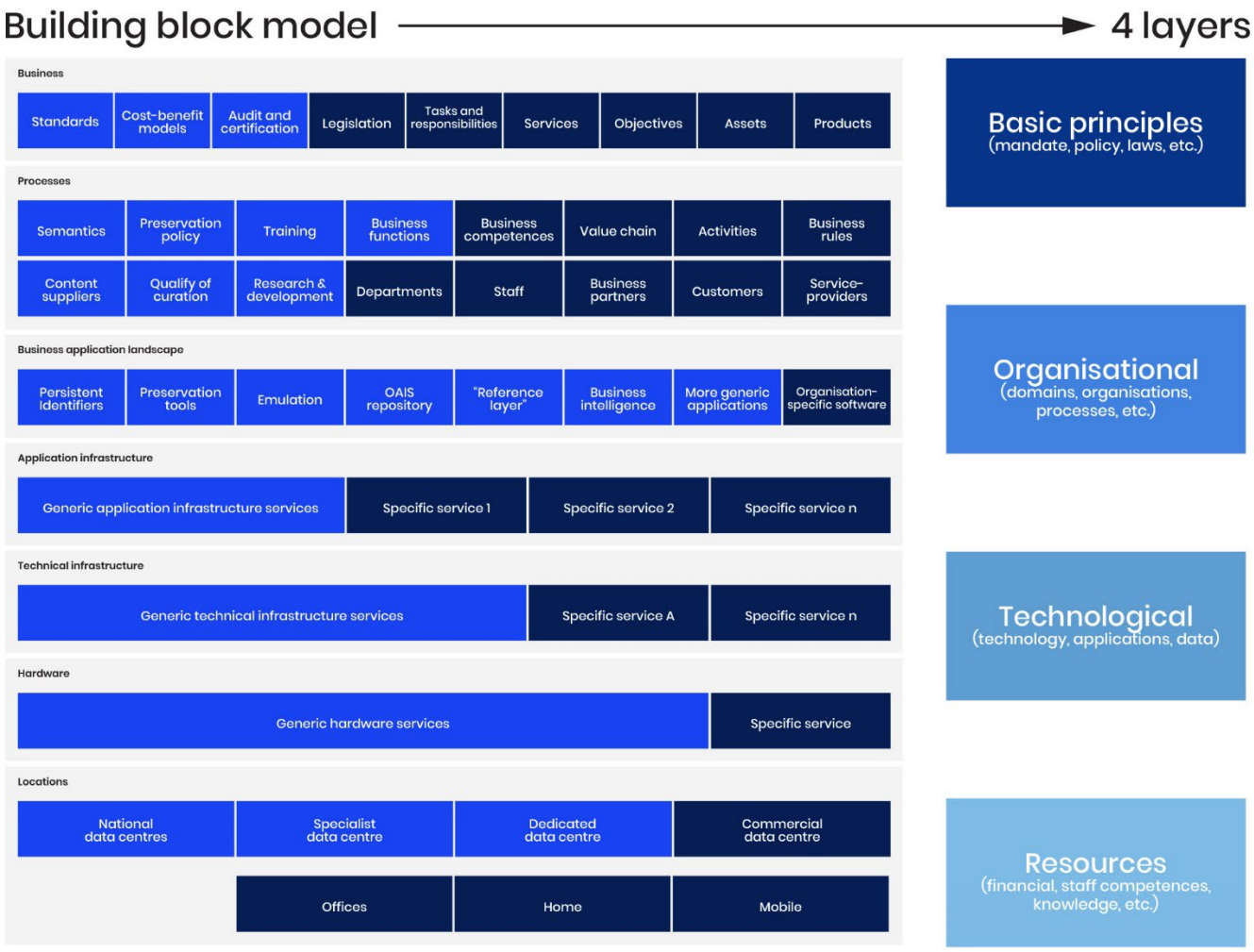

Figure 1: The building block model set against the four layers of the Big Picture Model

The four layers are defined as follows:

Alongside the organisation's mission and long-term vision, the **basic principles** consist of all forms of legislation applying to its tasks and activities. The preservation policy is a key component of these basic principles, which also encompasses other documents, both internal and external. These include the organisation's collection policy, information policy and user profiles.

The **organisational layer** comprises all products, services and processes that are relevant to digital preservation, as well as the way in which the organisation develops products and services.

The **technological layer** consists of the technical facilities needed for curating digital information. These include a digital archive, as well as storage media, networks and servers. This layer also contains the data themselves, i.e. the digital objects under curation. Finally, it also includes the security measures used to safeguard the integrity of the data.

Resources, finally, comprise the long-term budget, the investment budgets, staff and the knowledge and competence required by an organisation. The Resources layer also includes staff awareness of the need for digital preservation.

Cost

We (the DDHN) developed a cost model in 2017,[11] known as the 'Dutch cost model for digital preservation'.[12] Our aim was to make it easier for organisations to control the cost of digital preservation. In order to do so, it is absolutely vital to have a clear picture of the cost structure and the cost drivers, not only now, but also with a view to budgeting for future costs. In designing the cost model, we built on schemes devised in the past, both in the Netherlands and in other countries. One of these was a project entitled Collaboration to Clarify the Casts of Curation (4C).[13] We also looked at a number of current models,[14] such as the Curation Costs Exchange (CCEx)[15] tool, which organisations can use to compare their own expenditure with the expenditure incurred by other organisations operating in the same field, both in and beyond their own countries. The CCEx records and controls costs at a high level of aggregation, but Dutch organisations found that they needed both a more detailed picture of costs and a link with cost drivers. In order to facilitate international comparison, we have incorporated a way to aggregate the costs in the Dutch cost model to the level used by CCEx.

The cost model is designed to help organisations to:

- analyse the costs of digital preservation and their component parts;
- monitor these costs so as to be better able to keep them in check;
- compare the costs of digital preservation with those incurred by other organisations, so as to learn from them.

The model makes it easier for organisations to factor cost considerations into policy decisions, including decisions on collection policy, on the use of staff and other resources, on partnerships with other organisations and on the necessary infrastructure.

The cost model for digital preservation is an activity-based cost model, i.e. it focuses on those activities that need to be performed to analyse the cost of preserving digital information. The model breaks the preservation process down into the following activities: selection and pre-ingest, ingest, processing, documentation, archive, access and user support. The model also incorporates a number of more generic activities that are closely linked to the process of ingesting, processing, archiving and granting access to digital collections. The model defines these as 'overarching process activities' on account of their importance and scale (expressed in terms of the amount of time and resources invested in them). The processes in question are metadata, preservation management, infrastructure and ICT. They are broadly similar to the functions in the OAIS model.[16]

The cost model for digital preservation generates information on the cost structure and the cost drivers as a function of activities. It enables organisations to assess the cost of the various process stages, both individually and in conjunction with each other. Organisations can gauge, for example,

[11] BMC, 2017, Onderzoek naar de kosten digitale duurzaamheid, NDE, January 2017, pp. 1-68.

[12] https://www.netwerkdigitaalerfgoed.nl/kennis-en-voorzieningen/digitaal-erfgoed-houdbaar/kostprijsmodel-digitale-duurzaamheid/

[13] 4C, 2015, Investing in Curation; A Shared Path to Sustainability, 20 February 2015, pp. 1-26. http://www.4cproject.eu

[14] https://www.4cproject.eu/summary-of-cost-models/

[15] An international 4C project relating to the Digital Curation Sustainability Model was developed during the period from 2013 to 2015. The aim of the project was to design a cost model for analysing and controlling the cost of digital preservation. A digital platform called CCEx was developed for this purpose (Grindley, N, 2015, The Digital Curation Sustainability Model (DCSM), 13 February 2015, 4C, pp. 1-38).

[16] The cost model for digital preservation includes a conversion table for converting the process stages and the overarching process activities into the categories used by the OAIS model.

whether the process stages help them to achieve the objectives of their preservation policy, and what the effect would be of adopting a different solution.

The Big Picture Model: aims

The Big Picture model is designed to help organisations arrive at well-informed decisions on the activities they need to perform in order to preserve their digital collections.

The Big Picture model starts in all cases by looking at ambitions, i.e. what the organisation wishes to achieve. This is a factor of its long-term vision, its mission and its tasks and responsibilities. Its preservation policy describes the way in which it wishes to preserve its digital collection in the long term. As we have already seen, this policy is the translation of the organisation's mission, long-term vision and tasks and responsibilities into a set of specific processes and procedures. This, in turn, determines the way in which the organisation is structured, as well as the knowledge and competences it requires and the technical infrastructure (i.e. the solutions) that needs to be put in place.

All this has an impact on cost. Equally, whether an organisation is able to achieve some or all of its objectives depends on the knowledge, competences, financial resources and infrastructure available to it. In other words, limited financial resources will limit an organisation's ability to fulfil its ambitions.

Organisations have three basic options from which to choose in preserving their digital collections in the long term, i.e. do it themselves, engage the services of an external (commercial) service-provider or form partnerships with other organisations. The umbrella term we have coined for these options is DOC:

- DIY
- Outsourcing
- Collaboration

In order to choose one of these three options, an organisation needs to have a clear picture both of its own resources and of the pros and cons of each option. In other words, it needs to know what sort of services an external contractor would be able to provide (in the case of outsourcing), what advantages might be offered by partnering with other organisations (in the case of collaboration) and what it might be able to do on its own (in the case of DIY). Any strategic choice must be well-informed, and the Big Picture model helps organisations to ensure that they follow a carefully considered, systematic process in arriving at their choice, providing information on relevant factors and arguments at the same time.

The model's component parts and the interrelationship between them

Previously in this article, we described the three aspects or components that together make up the Big Picture, i.e. preservation policy (which forms part of an organisation's basic principles), solutions and cost. The question now is how these three aspects interact with each other and how they affect the choice between going it alone, outsourcing to an external contractor, or partnering with other organisations.

In order to arrive at a good choice, an organisation needs first to carry out an impact analysis. This means assessing the impact on the following four factors: quality, vulnerability, opportunities and cost. The cost factor is the result of the choices made by the organisation in its preservation policy (i.e. it all hangs together with its basic principles) on the one hand, and the solutions on the other. In other words, cost is not in itself the prime determinant – as is often the case in practice. In the Big Picture model, cost is one of the elements included in the impact analysis and is hence one of the factors taken into account in arriving at a decision.

The four factors involved in the impact analysis are:

- **Quality** of the process of digital preservation. Which of the three options (DOC) is most effective?
- **Vulnerability**. This means assessing the quality of the service provided. Is it continuous and reliable? How vulnerable is it in terms of organisation, technology and resources? An organisation may well be able to reduce its vulnerability by choosing another DOC option.
- **Opportunities**. When an organisation opts for one of the three DOC options, this creates opportunities for putting its preservation policy into effect. These opportunities can generate certain benefits for the other factors, i.e. quality, vulnerability and cost.
- **Cost**. Certain costs needs to be incurred in order to bring about long-term digital accessibility. These costs result from the DOC option chosen by the organisation (i.e. the choice between DIY, outsourcing and collaboration) and the impact that the chosen option has on the solutions (in terms of organisation, technology and resources) and the basic principles.

By ensuring that all four above factors are included in the impact analysis, the organisation has a clearer picture of the likely outcome of the process.

Internal focus

The first step in the use of the model involves identifying the organisation's current status. This means answering the following questions:

- What are the organisation's ambitions?
- What are the organisation's basic principles (i.e. the objectives of its preservation policy)?
- How is the organisation currently structured (in terms of organisational structure, technical infrastructure and resources)?
- Are the solutions that the organisation has chosen to adopt in the past consistent with its current ambitions?

The second stage in the model is an initial consideration of the three DOC options, i.e. DIY, outsourcing and collaboration. In the case of an organisation with an internal focus, we assume that it has a preference for DIY, i.e. going it alone. The organisation then performs an impact analysis based on the four factors described above, i.e. quality, vulnerability, opportunities and cost.

The following figure shows how these two stages work in practice.

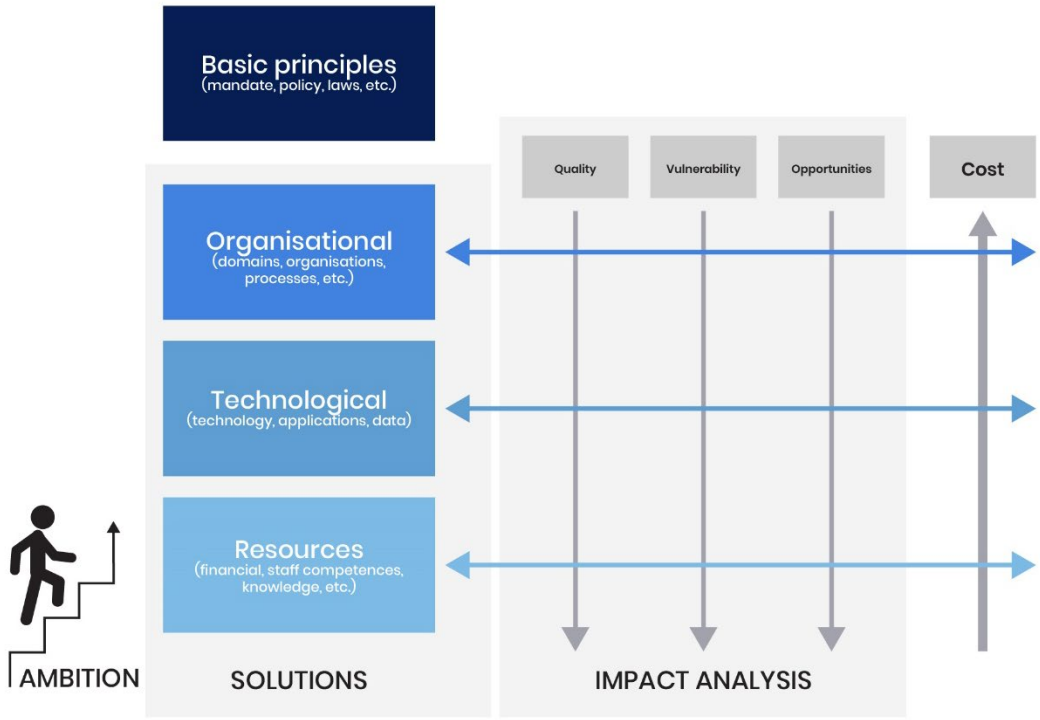

Figure 2: Identifying current status and impact analysis for DIY.

The result of the impact analysis may indicate that the DIY option is not the most desirable course to follow. It may also suggest that the organisation should explore other, external means of achieving its ambitions.

Exploring external alternatives

The results of the impact analysis may also indicate that a change of course is needed if the organisation is to achieve its ambitions. This means looking at the other DOC options, such as the solutions offered by commercial service-providers, to see whether they are consistent with the organisation's ambitions. It could also mean exploring the opportunities for collaborating with other organisations that are members of national or international networks. In the case of the Netherlands, this would involve exploring the opportunities offered by the members of the Dutch Digital Heritage Network (NDE). At an international level, the Open Preservation Foundation, the Digital Preservation Coalition, and so forth would all form interesting starting points.

This means adding a number of new dimensions to the model that require exploration and analysis. In other words, if an organisation opts for outsourcing or collaboration, what impact would this have on quality, vulnerability, opportunities and cost? We have deliberately placed cost at the end of this list, as it is the result of other factors. In practice, however, many organisations tend either to start with the cost aspect or to assume that cost is the only consideration that needs to be taken into account. This produces an incomplete picture.

The following figure shows the exploration of external alternatives. The DIY option is also shown.

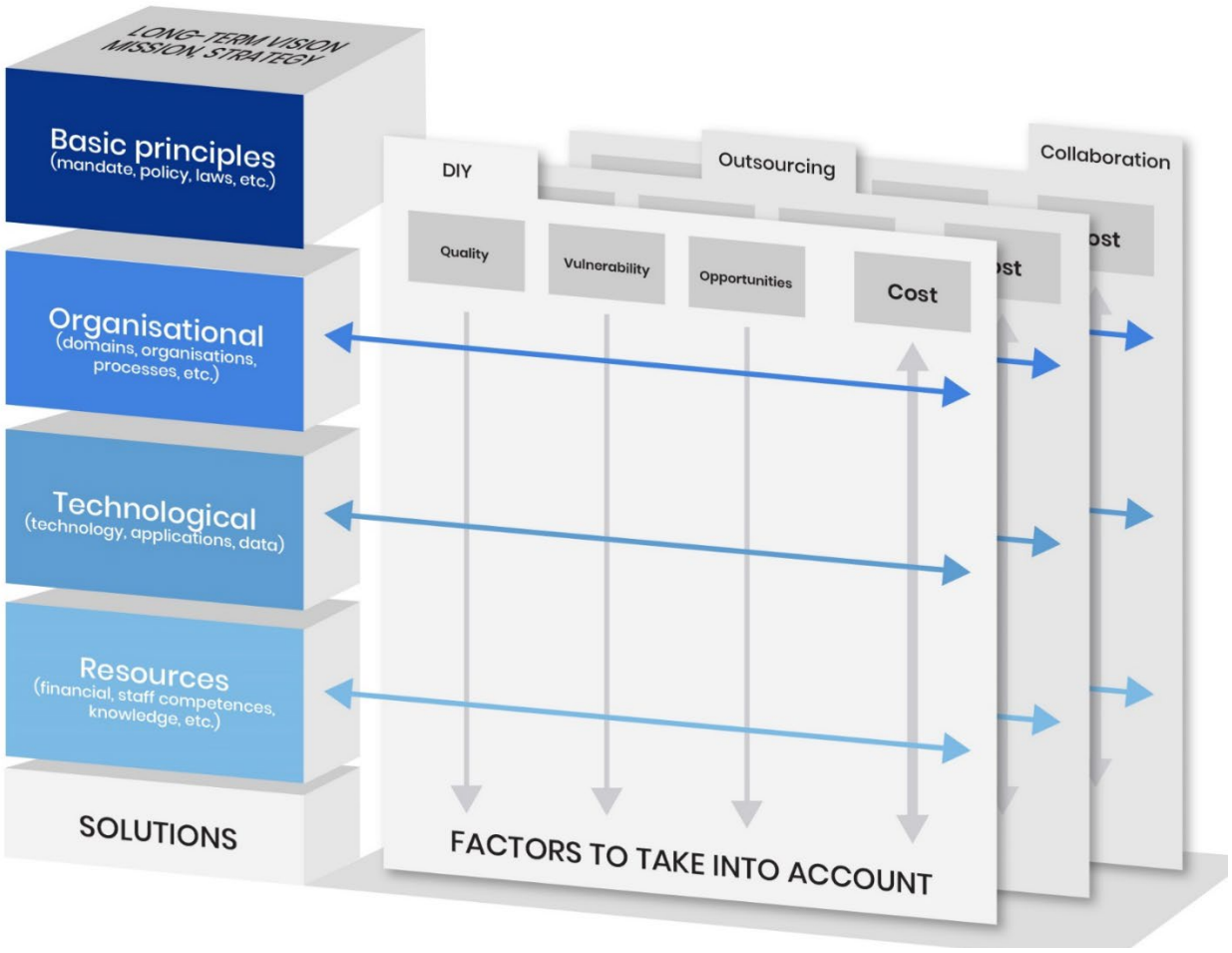

Figure 3: The external focus of the Big Picture Model

Whichever DOC options an organisation chooses affects the Solutions and Basic principles. For example, an organisation that opts for DIY will need to invest in staff resources, whereas a decision to outsource or collaborate with other organisations will require more organisational capacity and skills on the part of the staff already employed by the organisation. In other words, each option throws up different questions and generates different effects in relation to organisation, technology and resources. In addition, the chosen option also often affects the basic principles, for example, if the chosen strategy proves to be ineffective, or if outsourcing or collaboration creates all sorts of new opportunities. This is illustrated by the following figure.

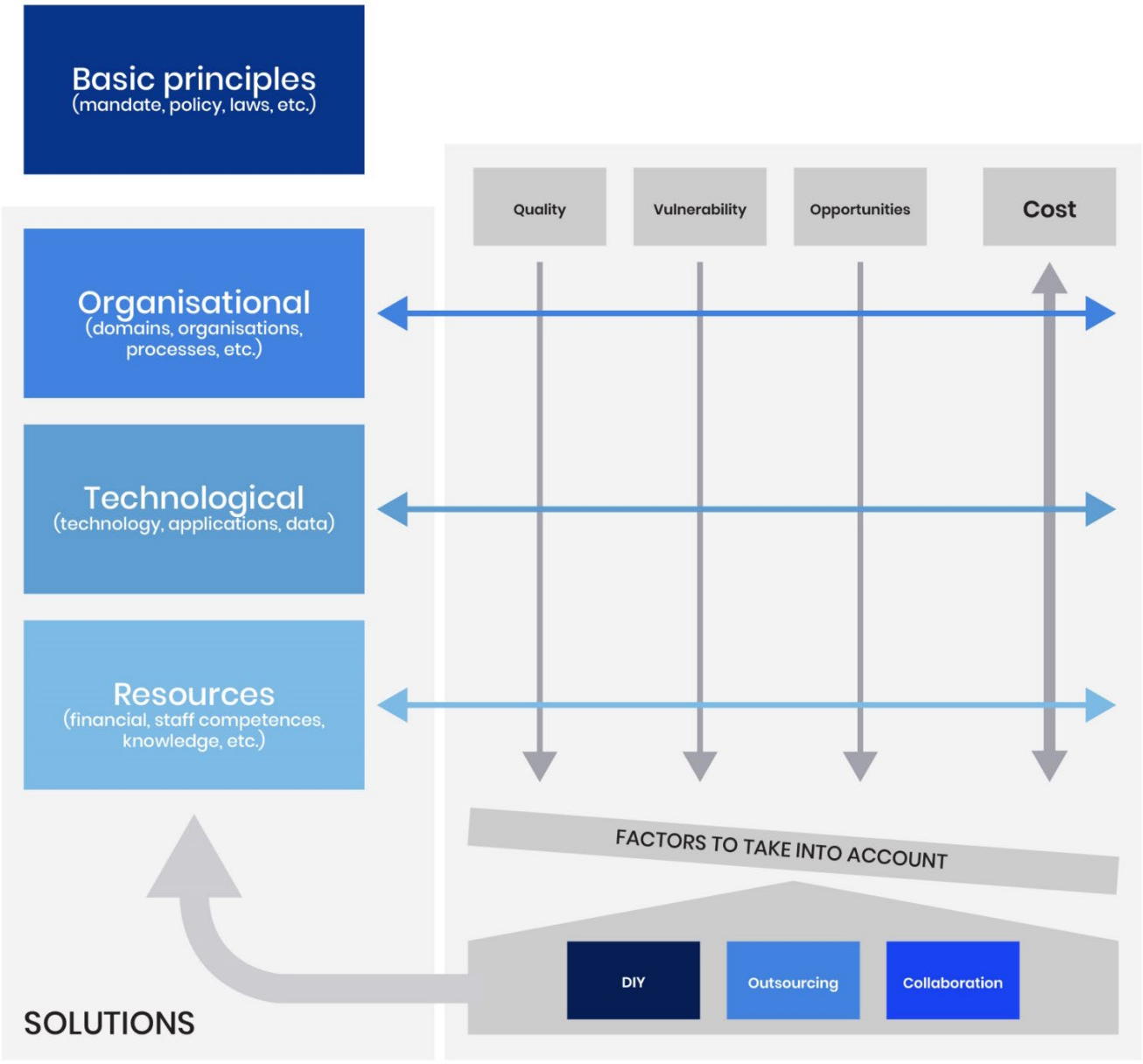

Figure 4: Factors taken into account by the Big Picture Model

The following text box explains the complete Big Picture model, taking into account both the 'internal focus' and 'exploring external alternatives': the complete range of options. A case study illustrates how the model works in practice.

The Big Picture: The Shoe Museum (example and game)

The Big Picture is a complicated model. We have designed a game to make it less complex and easier to use. The game requires you to work through the model stage by stage. The example given below involves a fictional Shoe Museum, which is planning to ensure that its digital collection remains accessible in the long term.

Case study

You are the project manager. You have just digitised a number of objects at the Shoe Museum. The results of your work are stored as TIFF files on a 1 TB hard disk. The Shoe Museum expects not only to digitise more material in the years to come, but also that more born-digital material will come on stream. It estimates the volume at 2-3 TB per year. The museum wants to preserve this material on a long-term basis: the minimum requirement is a local version (preferably held in a repository in The Netherlands) plus cloud storage, with regular fixity checks.

You have been asked to organise storage within a two-year time limit. To this end, you have been allocated an annual budget as part of the museum's regular budget.

The focus in the museum's preservation policy lies on integrity checks, shadow copies and recovery in the event of data loss. The museum is (for now) not focussed on metadata, rights and access. The access procedure has already been arranged.

The game requires you to make certain recommendations on the basis of the above information. This involves working through the model step by step:

1. The first step involves formulating a set of basic principles for the Shoe Museum. The player has to work out which policy frameworks are relevant and which laws apply to the storage facility.
2. The player then outlines the solutions currently used by the museum. In other words, how has the Shoe Museum arranged its organisational structure, technological infrastructure and resources? For example, what application is currently used by staff for managing the collection? How large is the organisation? Do the staff consist mainly of volunteers or are there more paid employees than volunteers?
3. The third step involves examining the first DOC option, i.e. DIY. The player analyses the impact of this option on three factors: quality, vulnerability and opportunities. The presence of a large number of volunteers on the staff may constitute a vulnerability, for example. Another vulnerability may be a lack of knowledge about how to achieve long-term digital accessibility and about the various storage options. Once the player has completed this impact analysis, he or she is then given information on the cost of DIY.
4. The player is then given information on the two other options, i.e. outsourcing and collaboration. This could mean sourcing the service from a big foreign service-provider that has a back-up facility in Europe (but not in the Netherlands) and who can offer cloud access

but is not familiar with the field and is therefore reliant on your subject expertise. Or it could mean joining forces with another museum, such as the (fictional) Liquorice Museum, which does have the necessary expertise, but which would mean that the Shoe Museum would become dependent on the other museum's policy (which differs slightly from its own wishes and requirements). In other words, the player is presented with a number of options and is required to perform a series of impact analyses, analysing the impact of each option on quality, vulnerability and opportunities.

5. So as to encourage the player to gear the impact analysis towards quality, vulnerability and opportunities, the cost of each option is only shown after he or she has completed the analysis based on quality, vulnerability and opportunities.
6. The player then decides, on the basis of the four factors (i.e. quality, vulnerability, opportunities and cost) which operational option to recommend for the Shoe Museum, i.e. DIY, outsourcing or collaboration.
7. Finally, the player examines the effect of his or her choice on the museum's organisational structure, technical infrastructure, resources and basic principles. For example, the museum may need to employ more staff (effect on resources), acquire a new computer system (effect on technical infrastructure) or it may find that its desire to store a local version of the collection is not practicable (effect on basic principles).

The game allows the player both to experience the workings of the model (i.e. how it is structured and the way in which each components affects the others) and to find out how operational and tactical factors come into play when taking strategic decisions. All this is designed to result in well-informed choices that take account of the effects on the organisation and its policy. The idea is to whittle the options down to the best way of enabling the organisation to achieve its ambitions.

Using the model

At a strategic level

The Big Picture model paints a systematic picture of the interaction between basic principles (policy), solutions and cost, making clear how each aspect affects the others. By doing so, it makes it easier for heritage organisations to take well-informed, strategic decisions on the digital preservation of their collections.

The model helps organisations to make choices based on:

- the operational options (DOC);
- an impact analysis;
- the possibilities afforded by the resources available to the organisation.

These choices may prompt the organisation to adjust the objectives of its preservation policy. A systematic approach such as this avoids the common practice of adopting an ad-hoc strategy in which decisions are based primarily on historical precedent or emotion.

At a tactical level

The organisational structure follows from the strategic decision on long-term digital preservation. Organisations can use the information generated by the model to translate the effects of a particular operational option into tactical effects – and also into solutions in terms of technology, organisation and resources. The model reveals the impact of each option, and organisations use this information in arriving at a strategic decision.

At an operational level

By analysing the impact on the four factors described above, i.e. quality, vulnerability, opportunities and cost, organisations are able to understand the effects of different choices. In other words, they can see what effect each choice has on their organisational structure, the way they operate and their ability to achieve their goals. The result is a helicopter view that paves the way for well-informed decision-making. Where the model is used for strategic decision-making, it can demonstrate not just the decision's effect at both strategic (i.e. on the organisation's preservation policy) and tactical levels (i.e. on the organisational structure), but also at an operational level, i.e. the effect on quality, vulnerability, opportunities and cost. This information forms the basis for further operational decisions once the organisation has reached its strategic decision.

In short, the Big Picture model helps organisations to underpin their strategic decisions with operational and tactical arguments. This enables them to take well-informed decisions that take account of their effects on their organisation structure and policy.

Credits

Tamar Kinkel (MSc) is a senior consultant in finance and operational management at BMC Advies, a Dutch-based firm providing consultancy services to government bodies and semi-public organisations. In addition to being involved in a range of projects relating to finance and operational management for local authorities, provincial councils and ministries, she worked together with Herman Uffen on the Dutch Cost Model for Digital Preservation.

Herman Uffen (MSc) is a senior consultant in finance and operational management at BMC Advies. He provides consultancy services relating to finance, operational management and organisation to a variety of public-sector organisations. He worked together with Tamar Kinkel on the development of the Dutch Cost Model for Digital Preservation, for which he also acted as the project manager.

Joost van der Nat is a partner in Singel & Partners. He has been involved since 2014 in the Preserve Programme operated by the Dutch Digital Heritage Network and was one of the developers of the 'building block model'. He is currently project-managing a project known as 'the tool box'. This involves the creation of a website (still under development) containing a structured, harmonised set of links to tools for helping to ensure that the Dutch cultural heritage remains preservable, usable and visible, both now and in the future.

Barbara Sierman spent 15 years working as the Digital Preservation Manager at the National Library of the Netherlands. She was closely involved in the development of the SCAPE Policy model, on which the NDE's 'Guide to Preservation Policy' is based. She started her consultancy Digitalpreservation.nl.

About this publication

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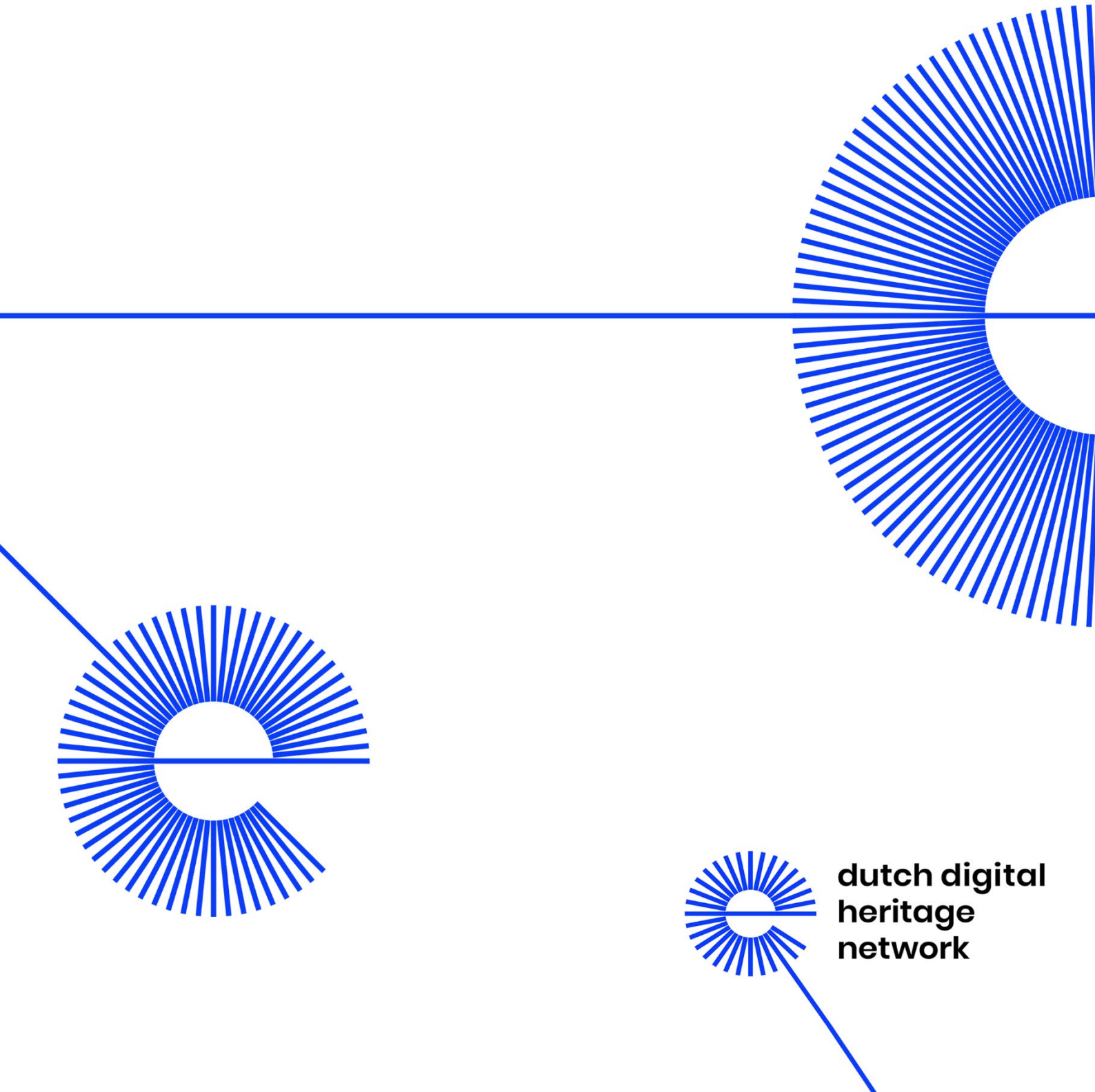

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