ROUTLEDGE GUIDES TO PRACTICE IN MUSEUMS, GALLERIES AND HERITAGE

ROUTLEDGE

The Sustainable Museum

How Museums Contribute to the Great Transformation

Christopher J. Garthe

The Sustainable Museum

The Sustainable Museum is the first book to outline a coherent strategy for the direction of museums, as it relates to sustainability in the museum and heritage sector.

Arguing that museums must place sustainability at the centre of all their activities, if they are to become key actors with a clear societal role, Garthe considers the issues that museums will likely face as they take on their new roles. Presenting case studies from a wide range of museums around the world, the book considers different ways of implementing sustainability in different types and sizes of institutions. Whilst the book clearly outlines the need for change, it also provides guidance about how to change. Garthe does this by considering specific concepts and approaches to sustainability in relation to the different aspects of museum operations. The book includes a hands-on manual for implementing sustainability management in a museum, whilst also considering the challenges practitioners will encounter and considering what the future of the sustainable museum might look like.

The Sustainable Museum will be essential reading for museum and heritage professionals around the globe. The book will also be of interest to academics and students engaged in the study of museums, arts and cultural management, business administration, change management or sustainable development.

Christopher J. Garthe is creative director and consultant for sustainability in museums and exhibitions. For museums, visitor centres and science centres he develops exhibitions related to sustainable topics and supports them to achieve a sustainable operation. He has studied geography, landscape ecology and regional planning in Hanover, Germany and Grenoble, France, adult education and lifelong learning as well as journalism in Berlin, Germany and received his PhD on education and tourism in protected areas. Since 2009, he has been working at studio klv in Berlin/Freiburg, Germany and is active as a lecturer, author and speaker on sustainability in the cultural sector.

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Preface and acknowledgements

Imagine if museums – one of the most complex organisations in contemporary society, as Robert Janes and Richard Sandell correctly point out – were to use their unique potential and their social interconnections to promote climate protection, greater social justice and well-being, in the broadest sense. Museums, as key social actors, would then act as multipliers for sustainability on both a local and a global dimension. This vision has been inspiring me for some time – and is the motivation for this book. I have been encouraged in this by numerous thought leaders in the field of museology as well as by my personal sounding board at the Institute for Ecological Economic Research, which has repeatedly affirmed me in my sense of direction.

I have carried out numerous exciting projects for and with museums – but I have never worked in a museum. This book therefore offers an external perspective on museums as an institution – and thus inevitably remains limited. Focusing on the global dimension of the idea of sustainability, the book explicitly does not look at the situation in specific countries.

This book was made possible only by the support of numerous people, to whom I am deeply indebted. I thank Nina Schallenberg, Andrea Wieloch and three anonymous reviewers for their valuable comments, as well as Sarah Sutton, Henry McGhie and Caitlin Southwick for their open and encouraging way of pursuing the vision of the sustainable museum. Jan Löken and Bernhard Kehrer made this book possible by providing support and space. Ulrich Petschow and Thomas Korbun have sharpened my thinking with their critical perspectives. For financial support, I would also like to thank the Andrea von Braun Foundation, which is committed to breaking down boundaries between disciplines and promoting collaboration between them.

1 Introduction

Sustainability in museums as a search and learning process

The big sociopolitical issues – climate protection, de-colonisation, social justice and digitalisation – are reflected in the museum sector and have triggered a discussion about changes in the way museums see themselves. The topic of sustainability is also playing a noticeably more important role – in conversations between colleagues, at specialist conferences and in publications. However, the discourse around sustainability in museums is often characterised by the need to clarify first what is meant by sustainability in this context. What needs to be explored is what sustainability can mean for museums and how it can be implemented in practice.

1.1 The status quo: orientation on unfamiliar terrain

As part of the process of reflection on change in the museum sector, a variety of projects and specific activities have emerged in museums, ranging from climate protection measures to pragmatic restitution efforts to a revision of the definition of what constitutes a museum. These model projects illustrate the many ways in which sustainability is becoming tangible in the museum sector. However, they are usually carried out in isolation from each other, without any systematic links being established.

The discourse around sustainability and its implementation is currently taking place in museums without a common frame of reference. However, in a field that is developing so dynamically, such a framework, in which interactions and measures could be embedded and related to each other, would be helpful. Furthermore, there is a need for a common language in which the topic of sustainability can be addressed in museums.

1.2 Preparation: exploration, compilation and inspiration

This book aims to contribute to taking sustainability forward as a search and learning process in the museum sector.

First of all, the book raises questions about how the general discourse on sustainability in all its many facets, one which has been going on for 35 years, can bear fruit in and for the practice of running a museum. What role could

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sustainability play for museums? Does the topic of sustainability offer new opportunities for museums? How can museums contribute to a sustainable future? The book thus pursues an exploratory approach. The aim is to make utopias possible and to initiate thinking that does not involve a binding concept of sustainability in museums, but it rather explores the thematic terrain in a search process.

In order to explore the terrain, the book picks out relevant aspects of the wider sustainability discourse and relates them to the museum. It shows overlaps and connections between the idea of sustainability in the broadest sense and the museum sector as a whole. The book is thus conceived as a broad and multifaceted compilation of aspects of sustainability in museums. Using the approach of applying already existing concepts to the museum, it adapts familiar tools and methods to this new field. As an overview, it also provides a context in which different discursive threads can be combined and thought through together. It thus helps to provide orientation and can contribute to the development of a consistent frame of reference.

A wide-ranging compilation of this kind inevitably takes a bird's-eye view, and at many points it will therefore not extend beyond the surface. Thus, important details of everyday work in museums cannot be addressed in detail. The book is not a guide to implementing sustainability in museums and for the most part refrains from making concrete recommendations for practice. It is also set within a rapidly changing context. Accordingly, this book seeks to provide an introduction to the topic and hopes at the same time to be able to provide some specific suggestions. In the spirit of a collective learning process, it is not only desirable but necessary that practitioners and academics should take up and explore aspects of this work in greater depth in future.

1.3 The content: sustainability, the museum and transformation

The book divides the topic into three parts. First, it situates the institution of the museum in the major discursive threads relating to sustainability. Next, it examines the specific fields of action in museums. And it concludes with a pragmatic framework designed to facilitate transformation within museums.

Part I develops a vision of the sustainable museum based on fundamental perspectives on sustainability. Then, from a cross-sectional perspective, several starting points and key areas for practical action by museums are identified. Part II focuses on operational issues for the museum and its various departments. The chapters here address the specific tasks and activities in the museum and illustrate sustainable practices. Part III translates the vision of the sustainable museum into practical action. This involves developing a tool for sustainability management and explaining its use in museums in concrete terms.

Part I

Museums and sustainability

2 The museum sector in transition

Global crises, especially climate change, and the social dynamics of the movement for climate action present new frameworks within which museums must position themselves. Can the concept of sustainability – now over 30 years old – provide a basis for how museums should respond? What might sustainability mean for museums?

2.1 Global crises as the starting point

The major challenges of the present day represent a new kind of problem; this applies to climate change, the economic and financial market crises, biodiversity loss, global division and migration. These problems are characterised by a close interlocking between human activity and the natural environment. Thus, even species extinction and desertification are best understood not as purely ecological phenomena, but as examples of problems in social-ecological relationships.

These many different crisis phenomena within different social-ecological systems are not isolated developments, each requiring its own solution. Rather, they must be considered in conjunction, and their interrelationships must be uncovered. They are developments that can be understood as different symptoms of a single central problem. The core of this "multiple crisis" (Brand and Wissen 2013) is the fossil fuel-based economy, which follows a growth paradigm governed by the principle of competition.

These hidden connections, along with the specific features and dynamics of the individual problems themselves, make it difficult to analyse these many different crises and to develop solutions to them.

Complexity in the Anthropocene

The proposed adoption of a new geological epoch, the Anthropocene, highlights the global impacts that humankind has had on the Earth's social-ecological system (see dazu Davies 2016; Crutzen 2006). Humankind's capacity for global impact in the Anthropocene means that all global challenges must be understood as complex, interconnected problems that affect biology, ecology, culture, technology, economics and politics.

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One characteristic of these global challenges is thus that they mostly involve problems, issues and associated solutions characterised by a high degree of complexity. This is evident, for example, in the fact that there are always several causes as well as several possible solutions as well as options for adapted behaviour. In addition, causes, impacts and adaptation options (for example with regard to climate change) may differ according to perspective. For example, the impacts of climate change may be grave in some regions but minor or even positive in others. Also, different impacts can be expected depending on the economic sector involved, and therefore different adaptation strategies may be required.

Long time horizons and the speed of change

The devastating effects of global crises such as climate change and biodiversity loss often lie a long way off in the future. Neither the internal structure of the political system, which is geared to parliamentary terms, nor the human psyche is accustomed to reacting to events that lie far in the future (Marshall 2015). Due to the slow pace of global change, researchers are increasingly focusing on long time series and scenarios. Likewise, scientific modelling and risk assessment relate to events that lie in the future. The growing importance of futurology is indicative of this.

Analyses carried out by Steffen (2011) on developments in the Anthropocene point to the rapid pace of change as well as the global scale of impacts and the increasing complexity. In addition, many of these problems are characterised by non-linear development, wherein tipping points may sometimes lead to significant changes of momentum and impact in a short period of time. One example of this is a weakening of the Gulf Stream and the consequences that follow. Moreover, a development that follows a tipping point is often irreversible, as is the case with the destruction of rainforests. An example of further, specifically temporal aspects of these global challenges is the connection between prosperity and the associated negative environmental impacts, with the latter occurring after a considerable time lag and therefore being hidden (Steffen et al. 2011, 749–751).

Uncertainty and risk

Because of these temporal aspects and because of the high level of complexity, probability and thus uncertainty play an increasingly important role in addressing these problems. Working with probability and with different scenarios is therefore an integral element of all future research. Complex questions also often lead to contradictory research results. This is because different bodies of knowledge are usually required to solve problems, resulting in different perspectives on the problem area depending on the disciplinary approach. From each of these competing bodies of knowledge, different insights can feed into the discussion of the problem. Thus, it is often not possible to derive an evaluation of a measure that will be universally valid for

different specialist perspectives. Global challenges are therefore often characterised overall by uncertainty. Uncertainties relate, on the one hand, to changes in the global nature-earth system and in subsystems such as climate or biodiversity. The example of climate change shows that the effects, especially at the local level, can at present only be predicted with a high degree of uncertainty. And this is even more true for social or societal developments such as global migration. Since predicting these changes and the associated risks is based on uncertain knowledge, discussions about the resulting impacts are often also characterised by conflicts over the validity of scientific-technical findings.

Such conflicts pose a challenge for the role and perception of science, and for the communication of science in particular, because they call into question the prevailing, fundamentally positivist understanding of science. The increasingly evident uncertainty also leads to growing scepticism towards and criticism of the world of science, its practitioners and its role in society. It follows that not only for the purpose of addressing the multiple crisis phenomena, but also for the communication of science, not only will the importance of knowledge grow, but the production of knowledge, i.e. science, will be the focus of greater attention in the future.

Wicked problems

Global challenges regularly impact a large number of people and have economic effects and are therefore often characterised by conflicts over underlying values. When conflicts about technical knowledge are compounded by discussions about deeper values and the objectives or guiding principles derived from them, then we can speak of wicked problems (Balint 2011, 2).

In fact, it is especially in the context of sustainability that values and norms play a decisive role alongside the uncertainty of research findings. For example, conflicting goals in the implementation of sustainability often touch on ethical and normative issues. This is why it is particularly often the case that questions of sustainability result in messy conflicts or wicked problems.

Moreover, if wicked problems become urgent, i.e. they need to be dealt with or solved quickly, we can also speak of "super wicked problems" (Levin et al. 2012). Super wicked problems are also characterised by the fact that those causing the problems can also be affected by them. Furthermore, analysing and dealing with the problems are made more difficult because there is no central authority with a sufficient mandate to do so (Levin et al. 2012).

Wicked problems are often not completely resolvable. Since they need to be understood as conflicts of values, they can only be discussed and dealt with in terms of fundamental normative principles. Appropriate methods might focus, for example, on dialogue and mutual learning, while scientific knowledge, technical information and expert opinions are of lesser importance. Wicked problems therefore require a new approach, one which covers the entire span from the individual level up to societal actions, and from local governance up to multinational cooperation.

Sustainability as a response to global challenges

In response to the global crises, the concept of "planetary boundaries" was developed (Rockström et al. 2009, 472). These are used to define a space within which humanity can develop on Earth without causing long-term negative consequences. The core idea is that exceeding certain thresholds could trigger geophysical processes that can no longer be stopped. An analysis based on these planetary boundaries shows that the most pressing problems are climate change, biodiversity loss and the nitrogen cycle (Rockström et al. 2009, 472).

Sustainability was developed as a reaction to the global ecological challenges. The further differentiation of the sustainability discourse and its transfer and application to a multitude of disciplines and fields of activity also addresses – in part not necessarily intentionally – the crises and wicked problems cited above. Sustainability is therefore an appropriate guiding principle and a framework for analysing these challenges and developing solutions to them. In particular, in its complexity and the diversity of approaches and methods employed, sustainability reflects the complexity of these crises. Whether sustainability at its core involves a critique of the economic growth paradigm is in some respects a matter of controversy, but it can be argued that such a critique is a prerequisite for achieving the explicit goals of sustainability.

Sustainability research has generated a large body of knowledge about the impact of humankind on the Earth system. With this knowledge comes responsibility: the current generation has a duty to use this knowledge to transform our interactions with the planet and with our fellow creatures in ways that mitigate the multiple crisis.

2.2 The concept of sustainability

"Sustainability" and "sustainable development" are terms that have now entered the general vocabulary. The success of these terms is due in part to the fact that a wide variety of understandings and meanings can be projected onto them. In this sense, sustainability can also be understood as a collective term that addresses many things and is used so broadly that it is difficult to grasp. In light of this, it is important to develop a basic understanding of this guiding principle in order to be able to move around confidently within the discourse and to identify where the interfaces with the museum sector lie.

Background and context

As a first step, it seems appropriate to outline the evolution of the principle of sustainability and the most important milestones in this evolution (see Figure 2.1).

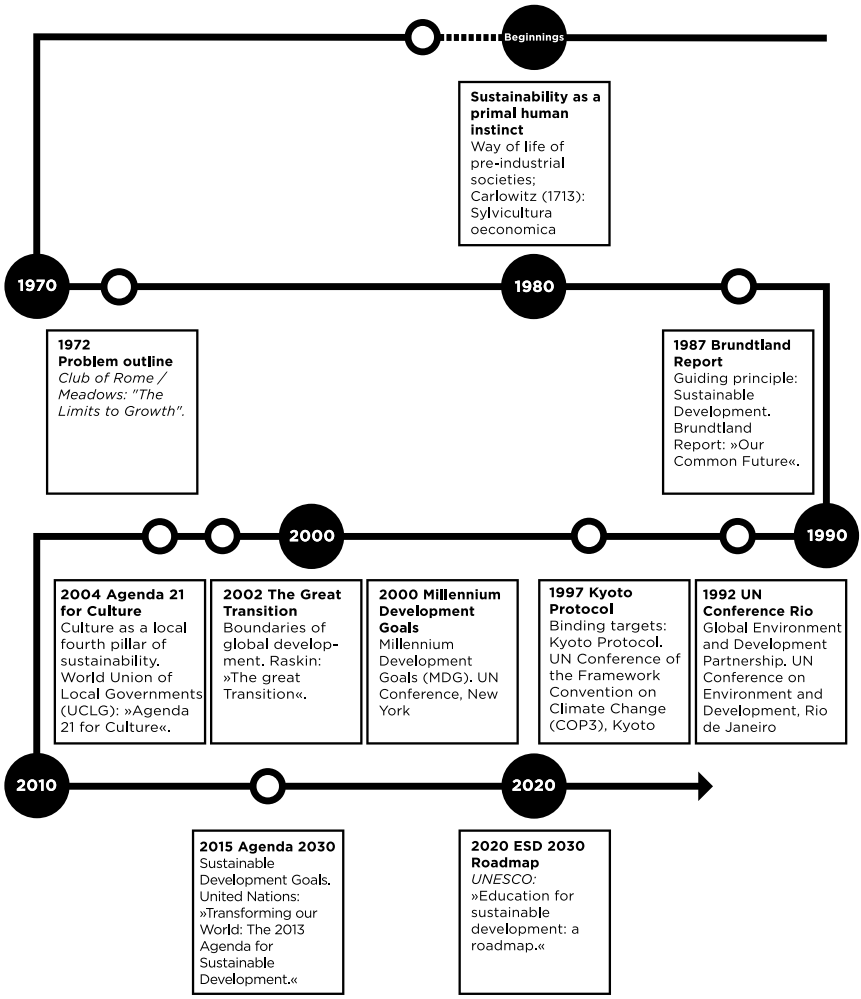

Figure 2.1 Milestones in the history of the concept of sustainability.

Beginnings sustainability as a primal human instinct

Long before the concept was explicitly formulated, the way of life of many pre-industrial societies was based on sustainable resource use. In the 18th century, sustainability was formulated as a principle of forestry (see Jahn and Carlowitz 2013). In this original understanding, sustainability means that the number of trees felled should not diminish the long-term productivity of the forest. By the middle of the 20th century at the latest, there was increasing evidence of the negative impacts of human economic activity on ecosystems, giving rise to worldwide environmental movements (e.g. Carson 1962).

1972 Outlining the problem: The limits to growth

The Club of Rome publishes a comprehensive study on the global impact of human economic activity and already identifies in this the core of the multiple crisis: the growth paradigm (see Meadows et al. 1972).

1987 The guiding principle: Sustainable development

The United Nations (UN) World Commission on Environment and Development publishes the report "Our Common Future". This is the first comprehensive formulation of the concept of sustainable development. The so-called Brundtland Report is the starting point of the discourse on sustainable development.

1992 A global partnership for environment and development

At the UN Conference on Environment and Development in Rio de Janeiro, numerous agreements are adopted that can be seen as a basis for global cooperation towards greater sustainability. These include the Rio Declaration, which establishes a global right to sustainable development, the Framework Convention on Climate Change, the Convention on Biodiversity and Agenda 21.

1997 Binding climate protection targets

In order to implement the UN Framework Convention on Climate Change, binding targets are set for the first time at the Climate Change Conference (COP3) in Kyoto. The Kyoto Protocol adopted there defines legally binding commitments to reduce greenhouse gas emissions.

2000 The Millennium Development Goals

At the UN summit in New York, eight development goals addressing global inequalities (Millennium Development Goals) are formulated. The purpose of these goals is to reduce poverty and global injustice by 2015 and at the same time to promote sustainable development.

2002 The Great Transition

"The Great Transition" (Raskin et al. 2002) is a study which determines the boundaries for future development and draws up scenarios for a sustainable future. Sustainable development is understood here as a dynamic process towards a great transition.

2004 Agenda 21 for Culture

The World Organization of United Cities and Local Governments adopts the Local Agenda 21 for Culture. The aim is to establish culture as the fourth pillar of sustainable development.

2015 Sustainable Development Goals

Agenda 2030 is adopted at the World Summit on Sustainable Development in New York. It outlines a comprehensive vision for sustainable development within a global partnership. At its core are 17 Sustainable Development Goals (SDGs), which are to be achieved by 2030.

2020 ESD 2030

The UNESCO study "Education for sustainable development: a roadmap" (United Nations Educational, Scientific and Cultural Organization 2020) explicitly relates the goals of Agenda 2030 to the education sector. It highlights interfaces and defines ways in which Education for Sustainable Development (ESD) can contribute to achieving the SDGs.

Fundamental values and the ethics of sustainability

The complexity of the problems and the systemic interrelationships both lead to a recognition that these challenges can only be overcome together. Respect, care and tolerance are fundamental values of a sustainability ethic – in other words, it is essentially about others, not about oneself. Sustainability is thus primarily characterised by altruistic thinking and behaviour. Sustainable development is therefore diametrically opposed to over-individualisation and the rat-race society, the competitive struggle under neo-liberalism and the anti-solidarity of globalisation (Latour 2018). Not only in its goals, but also in their implementation, it is based on openness towards others and the world around us.

What also follows from these considerations is the central importance of social justice for the concept of sustainability. In the worldwide perspective required by ecosystem problems, this means social justice on a global dimension. Everyone, everywhere, has an equal right to a good life ("buen vivir" (Vanhulst and Beling 2014)). Another characteristic is the addition of a temporal perspective, which is borrowed from long-term ecological processes. This results in an intergenerational approach to justice. All people, including those in the future, have a right to a good life. The concept of justice is thus expanded by the idea of sustainability: it includes a global dimension as well as an intertemporal component. This understanding represents the normative core of sustainability theory (Ekardt 2020, 152–153). This version of justice can also be described as *Enkeltauglichkeit*, or ensuring that the planet is still fit for our grandchildren (Ott 2020).

The understanding of and discourse on sustainability

The use of the term "sustainability" has increased at an inflationary rate over many years and has now been trending for quite some time. In public discourse, sustainability is interpreted in different ways (see Buchal 2016). For the sake of appearing contemporary or progressive, the terms "sustainable" and "sustainability" are repeatedly used in a blurred and also misleading way.

Perhaps the most common misleading use is when "sustainable" is used synonymously with "long-term". A blurred use of the term not only cedes it to other interested parties who can shape the discourse to their own ends by using divergent meanings, but also risks discrediting the whole vision and discussion of the sustainable museum.

Although numerous definitions exist, this book focuses on the original understanding, and in a further step relates the classical definition to the museum sector. In the context of systems research, Meadows et al. in their study "The Limits to Growth" described sustainability in very general terms as a state of global equilibrium (Meadows et al. 1972). The authoritative definition of sustainable development describes a development as sustainable if it meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1987, 43). Sustainable development can also be understood as a search, reflection and configuration process following the guiding principle of a globally fair and at the same time sustainable way of living (Michelsen et al. 2016, 26). It is also possible to distinguish between the meaning of sustainable development and sustainability, because the term "sustainable development" implies a dynamic which, at its core, presupposes growth – presumably economic growth (Springett and Redclift 2015, 16).

Sustainability can also be understood as a concept with three dimensions. This view draws attention to the fact that intergenerational justice, as called for in the Brundtland Report, is only made possible by integrating different perspectives. According to this view, sustainability is based on three pillars: the economic, the ecological and the social. Contrary to this, sustainability today is often misunderstood as a so-called green concept. However, an understanding which is reduced to ecological challenges and possible technical solutions is much too narrow. Even if ecological problems are the starting point, sustainability does not primarily address ecological issues, but instead places people at the centre: human beings, their needs and the Good Life.

Key ideas of sustainability

Transformation and cultural change

A global Great Transformation is necessary for a sustainable future. A new social contract is necessary for such a sustainable transformation of the economy and society. Sustainability thus aims at cultural change in all areas of society (see German Advisory Council on Global Change 2011).

Degrowth and sufficiency

Sustainability calls into question the paradigm of economic growth. It offers visions of a post-growth society where less production and consumption lead to greater equity and a new understanding of prosperity (see Jackson 2009).

Sufficiency encourages a focus on the right measure in our society of over-abundance and develops approaches for reducing consumption.

Global responsibility and CSR

The goal of more equitable global development implies that the Global North and, in particular, companies and institutions with international links have a special responsibility for implementing sustainability. In the corporate sector, the approach known as corporate social responsibility (CSR) represents this idea. However, CSR encompasses not only social aspects but refers to corporate responsibility for all impacts relevant to sustainability.

Glocalisation and Local Agenda 21

Systemic, global challenges must also be addressed from below, via concrete action at the local level. The slogan "Think global, act local" encapsulates the connection between globalisation and local significance from a sustainability perspective. Local Agenda 21 provides a framework for glocalisation on the ground.

Participation and cooperation

Sustainable development is a process that is fundamentally agreement-based and implemented through participation and cooperation. Grassroots movements and deliberative democracy approaches are an essential element in the realisation of a socially just transformation.

Learning and adaptation

The diverse challenges of the multiple crisis require an adaptive approach to solutions. In this sense, sustainability is a search and learning process that does not follow a predefined path. Such an open approach also takes into account the long time horizons, the uncertainties and the need to resolve conflicting goals.

2.3 Sustainability in the museum: Between utopia and banality

The effects of the global crises and the guiding principle of sustainability are connected in many ways to the work done in and by museums. However, the complexity of the term and the wide range of different requirements it imposes make its transposition into the world of the museum a significant challenge.

Nevertheless, a focus on social impact and transformation is already being brought to bear in numerous and diverse ways in the museum sector. For example, as early as 1972, the UNESCO World Heritage Convention, together with experts from the museum sector, developed a recommendation

for museums to focus on their social impacts. In museum practice, community-based museums and eco-museums have existed for many years, two examples – albeit with different emphases – of how to develop, advance and implement locally embedded museum work with a focus on social and ecological sustainability (Brown 2019, 4).

Sustainability lies at the core of the mission of museums

The ethical guidelines for museums represent a good starting point for the search for links to sustainability in the museum sector. Conservation for future generations (The International Council of Museums 2017, 14), one of the central tasks of museums, encompasses an intergenerational perspective on the future and thus a core element of the concept of sustainability. In this sense, museums can be understood as long-term and comprehensive archives for humankind. Given their long-term perspective, museums are predestined to promote a kind of thinking that is intergenerational. For museum staff, working with long time frames is a daily routine – a long-term view of the future, as required by climate change processes or the intergenerational perspective of sustainability, is therefore especially appropriate (Janes 2015, 4). In this respect, the perspective of *Enkeltauglichkeit*, on our legacy to our grandchildren, is particularly pertinent in museums.

Museums preserve cultural assets and collections for coming generations. But sustainability is much more than conservation. Conservation in fact creates numerous conflicts of objectives with the guiding principle of sustainability – the climate change impacts of energy-intensive museum buildings are just one example. The task of conservation therefore does not automatically entail an orientation towards sustainability.

The task of conservation can also be understood on a global dimension. If the global climate crisis continues to worsen, questions of the indoor air quality in museums are among the least of the problems for collections of objects. Museums and collections will then be at risk from extreme weather events and other global dislocations. After all, cultural heritage items and collections are not only stored in storage facilities, but ultimately on Earth. Sustainability and climate protection can therefore be understood as the ultimate preventive conservation (Sutton and Wylie 2008, 5). This argument is actually obvious and compelling – but is unfortunately all too often forgotten: what is bad for the planet is also bad for museums.

Sustainability is a higher-order task

In the meantime, the global crises and the changes they have necessitated have taken hold fully in the museum sector. What the word "museum" means and what constitutes a museum have never been more open to debate. The discussion about this is being conducted not only in the plenaries and corridors of specialist conferences but also through the process of re-imagining museums being undertaken by the International Council of

Museums, or ICOM for short (The International Council of Museums 2021). As part of this process, the definition of a museum and the ICOM Code of Ethics are being revised. With regard to sustainability, one thing has become clear already in the interim results: sustainability is clearly not understood as just one more task, or another core action area for museums. Rather, it is seen by just under half of those interviewed in the second consultation stage as a fundamental value of museums (Erika et al. 2021, 48). This highlights an important argument in the discussion on the sustainable museum.

Sustainability is therefore not just one more task for museums. It is not something else that has to be accomplished. Sustainability is much more a question of how work is classified, taken forward and completed in museums, and what meaning is given to it. It is thus a profoundly cultural issue. Sustainability can also be understood as the fundamental understanding or the social glue that shapes the work done in museums. The many examples of good practice in museums around the world can often already be considered sustainable today, even if they were not conceived and are not currently being described in this way. The perspective of sustainability enables tasks and activities to be reflected upon and evaluated anew – and thus creates a unique opportunity to improve museum practice.

Nor can sustainability be an independent, new mission or task for museums, as it cuts across all the other areas of responsibility. It touches all areas and thus never stands on an equal footing with other tasks such as collecting, conservation or interpretation. Sustainability thus also has the chance to unite museum staff across departmental boundaries and disciplines, to create a sense of community and in this way to become a joint project for all staff. The professional connections and working realities of different specialist staff in the museum, for instance in conservation and in education, and what motivates and drives them, are sometimes very far apart. This is where sustainability can provide a common language and a shared everyday working reality.

The complexity of the global crises requires museums to re-evaluate their sense of identity. In this context, the vision of a sustainable museum can also serve as a vehicle for strengthening the relevance of museums. Sustainability is thus the topic of the future for museums. If museums want to remain relevant, they must enshrine sustainability as a central concept.

Obstacles and preserving the status quo

The interfaces identified above between museums and sustainability are currently not being systematically addressed and developed. Overall, the integration of sustainability aspects into museum work is only just beginning. This suggests – more than 30 years after the publication of the Brundtland Report – that there are numerous obstacles in the museum sector. There are indeed a number of both drivers and inhibitors of the dynamics of change in the museum sector (Sutton 2019, 433). Drivers include general societal

dynamics, as well as increasing momentum in the museum sector, a readiness to innovate, the demands and requirements of visitors and staff, and new funding programmes. Obstacles include budget constraints, difficulty in accessing expertise on sustainability and insufficient resource allocation from management. There are also specific reservations and counter-arguments among staff in museums regarding the changes required to become more sustainable. These include a lack of time and the fear that resources for other tasks within the museum will be reduced (Sutton 2019, 433). One narrative based on these arguments is that of sustainability as a so-called luxury project. This means that sustainability is often treated as something that can be implemented only if and when the overall situation – in particular visitor numbers and the budget – makes it possible.

From "nice-to-have" to "must-have"

Against the background of digitalisation, de-colonisation and shrinking funding, sustainability does not initially appear to be the most pressing of problems. At the end of the day, sustainability is not a must-have for running a museum, not an obligation, but rather an optional activity when nothing else is on the agenda – this is the unconscious conviction, or sometimes the considered line of argument, of many critics of the sustainable museum.

It may therefore be worthwhile to take a look at other sectors. In many other sectors, sustainability has already gone from being a "nice-to-have" to a "must-have". Sustainable management is moving ever further up the corporate agenda. One important reason for this change is the pressure from funders and sponsors. In other sectors, it is already common practice to grant more funding if the company or institution has a clear sustainability management system in place. Sustainability is no longer a "nice-to-have" for industry leaders, but a necessity. Sustainability criteria may therefore also play a central role in decisions for or against (project) funding in the museum sector in the future.

If secure core funding from the public purse is in place, then external changes can never pose an existential threat – just as in other areas of the non-profit sector. This means that sustainability can also be seen by many as a requirement that can safely be neglected. Museums that receive all or most of their funding from the public purse therefore have a special role to play within the sectoral dynamics of change in this area. In the public sector, a comprehensive orientation towards sustainability will probably not be implemented by the majority of institutions unless there is a binding requirement for the introduction of sustainability management or if such a change is directly linked to benefits for the museum in question. It follows that for the sector to be transformed, either sustainability measurement or sustainability reporting must become mandatory, or else the allocation of public resources must be linked to sustainability performance (Adams et al. 2014, 58).

Museums and their tasks will inevitably change because of global challenges and developments (Cameron 2015, 345). And if this fundamental change cannot be stopped anyway, it seems only wise to seek to manage it proactively. The following chapters are intended to provide inspiration on how this can be done.

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3 The vision

The sustainable museum

The vision of the sustainable museum draws on numerous approaches that outline in similar ways the importance of museums in relation to contemporary challenges. These include ecological (see Sutton and Wylie 2008) and social responsibility perspectives (see Sandell 2016; Janes and Conaty 2005) as well as those emphasising the role of museums in climate action (see Cameron and Neilson 2015) or in social movements (see Janes and Sandell 2019b). Building on this, a constructive process of reflection and discourse on change in museums as well as in the museum sector as a whole has evolved (see Black 2021; Janes 2013). But how can these diverse approaches be integrated into the practical work of museums? How can museums coordinate the different requirements and harmonise their implementation? The vision of the sustainable museum offers a context in which the discursive threads can be connected and thought through together. In this way, a consistent frame of reference with a common language can be developed, one that makes it easier for all those involved, i.e. the staff, the public and other stakeholders, to work together and thereby to contribute to solving the challenges – whether pertaining to ecological efficiency or to social justice. The sustainable museum also offers a great opportunity to simplify the implementation of measures through a clearly structured process, to exploit synergy effects and to address conflicting goals.

3.1 Sustainability as a guiding principle for museums

Sustainability as a guiding principle for museums means focusing on the question of how museums can contribute to a socially just future within planetary boundaries. This requires that the global and intergenerational impacts of museum work in particular are taken into account. The guiding principle of sustainability sharpens the focus on the function of museums in social-ecological system contexts and highlights the specific potential of museums to contribute to a globally sustainable future within these systems. For this to happen, sustainability has to move into the centre of museums' sense of identity and to fundamentally shape the work carried out there. Under this guiding principle, new kinds of museums can be created which can help to renew the cultural, social and economic structures around them.

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Four principles of the sustainable museum

Work in the sustainable museum follows four principles that serve as the basis for all the approaches, recommendations and measures that. Overall, these principles can be regarded as essential prerequisites for successful sustainability management (see Figure 3.1).

Clearly, the most important foundation is a commitment to the idea of sustainability. Since sustainability is a normative concept, this implies that the work of museums – unlike in the past – must be based on values. Sustainability provides the normative foundation for the work of the sustainable museum. This means that museums seek to contribute to a better life, a fair allocation distribution of resources and a more responsible interaction with nature. The normative foundations of the sustainable museum can be directly related to the concept of institutional empathy, which is conceived as a museum practice that emerges in a genuine and deep exchange with people in the immediate environment – communities, visitors, staff members (Jennings et al. 2019, 505–511).

In addition, the sustainable museum operates with an orientation towards impact. Thirty years of researching, experimenting in, learning about and implementing sustainability have shown that a fundamental change in the way we live, work and manage our economy is necessary. The second principle of the sustainable museum therefore consists of working towards a comprehensive social transformation and its practical implementation.

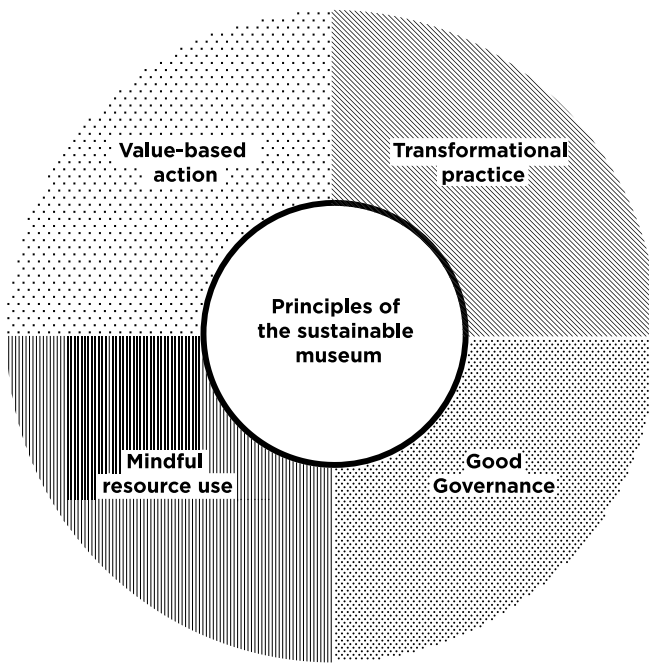

Figure 3.1 Principles of the sustainable museum.

This outward-looking perspective involves identifying the main levers that museums have for contributing to a Great Transformation (cf. Chapter 4).

Implementation focuses on the social and organisational aspects of the change process. The overall system of leadership and management of a museum can also be referred to as governance. Governance refers specifically to forms of political and social control that are not (fully) institutionalised. Governance thus emphasises a cooperative approach to the management of museums on multiple levels. Good governance aims at a good, conscientious and responsible exercise of this cooperative management approach in the interests of good professional practice.

The careful use of resources is a central element of the working culture of the sustainable museum. This applies to both material and non-material resources. In addition to buildings and collections, these include other infrastructure elements, equipment and materials, but also staff, knowledge and financial resources. The responsible use of resources ensures a healthy ecological and economic bottom line (Wedl and Reimoser 2016, 15).

Dimensions of sustainability in museums

Sustainability is often conceptualised in terms of three dimensions or pillars: ecological sustainability, economic sustainability and social sustainability. This perspective led to the concept of the triple bottom line, which applies to corporations and is widely used in sustainability management. However, the triple bottom line approach underestimates, for example, the role that museums can play in complex transformation processes at the local level (Errichiello and Micera 2018, 16). Ecological, economic and social aspects are also important for museums. But this approach overlooks a central aspect of every museum, namely the interaction with the visitor. Museums therefore need to integrate programming as another dimension of sustainability in a museum context. When applying the idea of sustainability to the museum sector, the fourth dimension of programming can be added to the three dimensions of the Triple Bottom Line. This concept for museums can be called the Quadruple Bottom Line (Sutton 2010):

- Planet, or the ecological footprint. The environmental impact of museums is the most obvious link to the concept of sustainability. There are two main approaches in this area of responsibility: firstly, resource management, and secondly, awareness-raising measures.
- People, or social justice. In museums, the issues of human rights, gender, indigenous peoples, displacement, de-colonisation and restitution are central to this field. In addition, aspects of inclusion, equality and access play a role in museum operations.
- Profit, or economic performance. For museums, economic sustainability includes questions about their financial resilience, savings through resource efficiency, and a post-growth strategy.

- Programme, or the mission of the museum. Sustainable programming means orienting all aspects of the programme towards sustainability, including, for example, exhibitions or educational activities as well as cooperative projects.

From the point of view of many museums, it seems obvious that culture should be incorporated as the fourth dimension of sustainability in museums, in addition to the three dimensions of ecology, economy and social issues (Stylianou-Lambert et al. 2014; Loach et al. 2017). It has also been pointed out that culture and sustainability are inescapably mutually dependent and that cultural development and dynamics have a positive influence on sustainability (Hawkes 2003, 2). Culture as the fourth pillar of sustainability is logical from a theoretical point of view and certainly appropriate for the broad field of cultural policy. The value of culture for sustainable development is also undisputed and reflection and discussion on cultural sustainability sharpens and enriches the sustainability discourse as a whole (Soini and Birkeland 2014, 221).

However, establishing culture as the fourth dimension of sustainability could complicate the implementation of sustainability in museums, because the interfaces between culture and museum work are so diverse that demarcation from the other dimensions, especially social sustainability, might become difficult. For the implementation of sustainability in museum operations, the cultural dimension remains too comprehensive and also too challenging. As a fourth dimension of sustainability, programme represents a narrowing of culture so as to address the specifics of museum operations. Sustainability as understood in this book thus follows a pragmatic and application-oriented view of museums.

Strong sustainability and the planetary boundaries of museum work

A further elaboration and specification of the concept of sustainability for use in museum work must also take into account the interactions between the dimensions of sustainability. The concepts of strong and weak sustainability are at the centre of this. Weak sustainability is based on the conviction that ecological, economic and social resources are worthy of equal consideration and can be balanced against each other. Economic considerations and the protection of the natural foundations for human life on earth are of equal importance. The image of a three-pillar model is often used to suggest this interpretation of sustainability. Strong sustainability, on the other hand, recognises that natural resources are often non-renewable and usually cannot be replaced by people or physical capital. This leads to the recognition that absolute limits to growth exist and that there is a developmental corridor for human development within which there is limited scope for implementing economic and social goals. This view of strong sustainability is also known as the doughnut model of sustainability (see 2018), which serves as a

starting point for the sustainable museum. Unlike in the three-pillar model, the economic system is here embedded within the social system, which therefore sets the framework conditions for economic activity. The social system is in turn embedded within the ecological system, which defines the planetary boundaries for the development of the economic and social spheres. The ecological dimension thus encloses both the economic and the social dimension.

The application of the three-pillar model often leads to economic concerns being given precedence on the grounds of jobs, prosperity and other social consequences. This means that ecological restructuring or social justice can only be implemented to the extent that this does not reduce the economic pillar too much. In the doughnut model of strong sustainability, this argumentation is no longer valid, as the social sphere and ecological limits set the parameters for economic activity (see Figure 3.2).

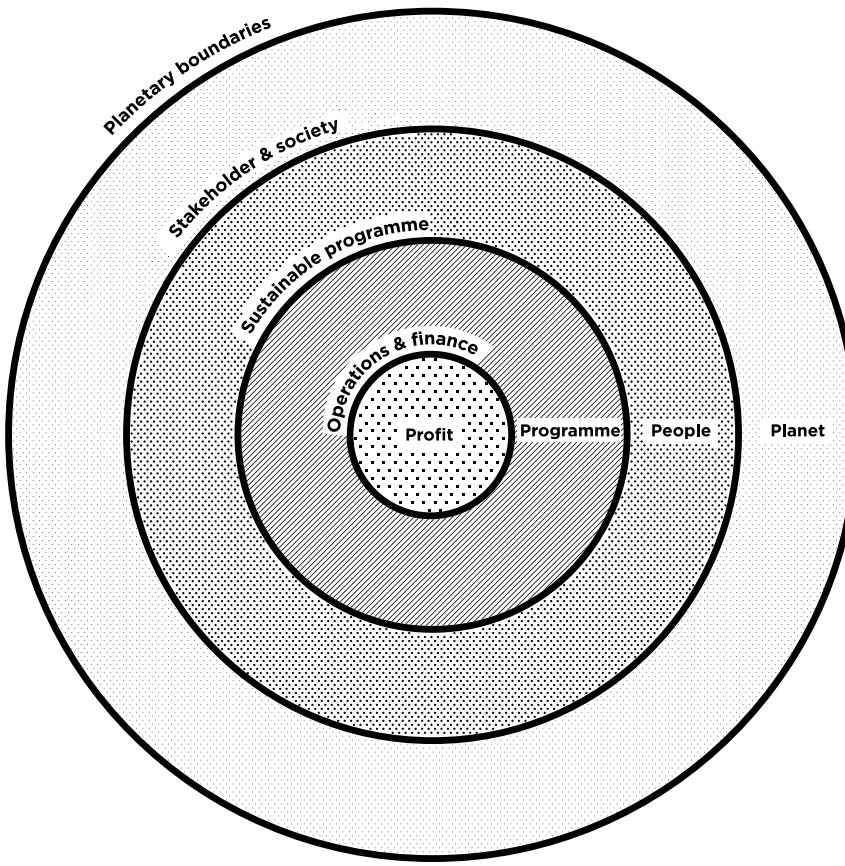

Figure 3.2 Dimensions of sustainability in the museum.

Source: Based on Raworth 2018, 12.

Pitfalls: Learning from 35 years of sustainability

The concept of sustainability is now around 35 years old. Research and evaluation results, starting points for measures and numerous experiences from other sectors are consequently available. Many pitfalls for the sustainable museum can be avoided by taking a look at implementation practice to date.

Sufficiency rather than only efficiency

Resource management is a good approach for making savings. However, an efficiency revolution – whether in the area of buildings and energy or in the transportation of cultural goods – is not the key to a smaller ecological footprint. Some reflection on the question of what constitutes enough and a definition of the right measure is the starting point for a change in thinking that will lead to a reduction in resource consumption (see Figure 3.3).

Degrowth rather than only Green Growth

At its core, the collecting mission is predicated on continued growth. Green, sustainable growth for museums reduces the negative impacts but does not address the core of the multiple crisis. Degrowth for museums means questioning the growth paradigm as it affects museums and positioning them in a post-growth society.

A holistic perspective on Enkeltauglichkeit *instead of only piecemeal technocratic responses*

Technical measures with regard to buildings are important steps on the way to an ecological museum, but they do not do justice to the guiding principle of sustainability. A reductionist focus on stand-alone technological solutions deflects attention from the fact that the way museums work and function needs to change fundamentally. Sustainability in museums requires comprehensive change at the strategic level.

A great transformation rather than only climate protection

Climate protection and the reduction of greenhouse gas emissions are omnipresent, not only due to the increasingly obvious impacts of global warming but also because of the global momentum of Fridays for Future. The Great Transformation needed, which involves the whole of society in a process of cultural reconstruction, goes far beyond climate protection. It is essential to realise that climate protection is one important building block for the sustainable museum, but not necessarily the most important one.

Political regulation rather than only individual behavioural change

Visitors – their values, their opinions and their behaviour with regard to sustainability – are of particular importance for a sustainable public orientation

for museums. However, this should not obscure the fact that changes in the political system are especially effective and that museums must play a bigger role as political actors.

The "art of the future" rather than only simple solutions

To many questions and challenges, there are no simple answers – and even fewer simple solutions. There are no patent remedies – certainly not for the museum sector. Rather, what is needed is an adaptive and creative approach to implementing sustainability, an "art of the future" (Schneidewind 2018).

Starting points for introducing sustainability into museums

Based on the principles of the sustainable museum, the dimensions of sustainability and the experience gained already in numerous museums, promising starting points can be identified that can be considered when implementing sustainability in the museum:

- Strategic transformation rather than isolated projects
  In everyday life as shaped now by digital media, even professional developments and discourses are becoming increasingly short-lived and tend therefore to be diminished to the status of superficial trends. At present, sustainability in the museum sector can certainly be described as a trend. Against this background, it is important not to fall into actionism. It is always good to become active and to implement ideas, start projects and put measures into practice. It is important, however, that these do not remain isolated individual projects – either in the individual museum or in the sector as a whole. The aim cannot be to tackle this complex issue simply on the basis of an exchange of experience and case studies.

  With that type of approach, the trend will have passed before the museum sector has developed a well-founded, holistic way of addressing the issue and a clear vision of how it can measurably improve its sustainability performance and contribution to society. Instead, it is important to use the momentum within the museum sector in a strategic, properly informed and collaboratively coordinated way to put the sustainable museum on a solid footing for the long term.
- Focusing on leverage effects
  Perhaps the most important starting point is the identification of fields of action where museums can act as multipliers and exert substantial leverage on others. If museums, through their own activities, succeed in getting others to act more sustainably as well, considerable societal effects can be achieved. Since the expectations of stakeholders outside the museum must also be taken into account here, such measures are comparatively difficult to implement. The most obvious multiplier role that museums play is with regard to their visiting public.
- Significant improvements

A stocktaking exercise will quickly reveal where the greatest potential for improving sustainability performance lies. Often, the energy sector is a good place to start, as efficiency gains can easily be made here that lead to lower energy consumption and at the same time reduce costs.

- Easy to implement, with immediate benefits
  A completely different approach – perhaps based on intuition rather than ratiocination – is to identify measures and areas that can be implemented very quickly and easily and where an improvement can be perceived at the same time. For this, it is very helpful to proceed in a bottom-up way and to involve staff from all departments.
- Internal motivation
  It is important for the long-term internal transformation process to encourage staff to get involved. Areas or measures that are particularly visible and that can serve as models are ideal for initiating improvements. In this way, staff can be motivated to work for greater sustainability in the museum in the long term.

Toolbox

Method | creating a vision

The vision: Sustainability change story

Rationale

The elements of today's multiple crisis – whether climate change, migration or food security – are global challenges that museums must contribute to solving. The societal momentum behind climate action and sustainability is driving museums to address these issues if they want to remain relevant to society as a whole. The integration of these issues and interests is also crucial if museums are to continue to attract large numbers of visitors. Furthermore, it is possible that funding criteria will in future be linked to sustainability requirements, so that for museums, economic self-interest underlines the necessity for a transformation process.

Objective

The transformation to a sustainable museum is the museum sector's response to these multi-perspective dynamics. This involves, on the one hand, internal sustainability, i.e. optimising museum operations in terms of climate protection and sustainability; and, at the same time, external sustainability, i.e. the impact of museums externally on both visitors and the wider society. The aim is to strengthen the contribution of museums to a social transformation towards sustainable development.

Strategy

In order to achieve the goal of a sustainable museum, it is necessary to take a look at the processes and working methods in museums. Here, the "Sustainability Management in Museums" framework offers a starting point. In addition, research, education and exhibitions need to be oriented towards the relevant aspects of transformation through sustainable programming.

What remains and what changes

This transformation process enables museums to remain at their core what they have always been: institutions centred around objects and collections for the conservation of natural and cultural heritage. The mission and tasks of museums remain unaffected by this transformation.

The museum as an institution is becoming even more open and discursive as a result of this transformation, it is acting more politically and with more focus on its impact, and it is presenting itself as more forward-looking and up-to-date. The work in museums is becoming more cooperative and more agile and integrating new values.

3.2 Museums and the Great Transformation

The vision of the sustainable museum emphasises the social relevance of museums for a sustainable future. This understanding has already been outlined and discussed from different perspectives, among others those of social responsibility (see Janes and Conaty 2005), governance (see Malaro 2014), soft power (see Lord and Blankenberg 2015) and activism (see Janes and Sandell 2019b). The social relevance of the sustainable museum includes in particular its contribution to a global process of change, a so-called Great Transformation.

Drawing on the transformation of the social order described by Karl Polanyi, the "Great Transformation" develops a blueprint for a transformation of society as a whole towards sustainability (German Advisory Council on Global Change 2011). The visionary narrative of the Great Transformation calls for a concerted effort to transform the major spheres of society, and this requires a new social contract. At the core of such a transformation is greater sufficiency and a realignment of the global economy (Schneidewind 2018). To this must be added the significance of a fundamental change in values, a "Great Mindshift" (Göpel 2016).

Göpel (2016) differentiates between instruments and measures according to their transformative impact, and divides them into different levels. Measures at the highest level, such as policies and typical practices of the Sustainable Development Agenda, have the lowest leverage effect. These include subsidies, taxes and standards. In the museum sector, this applies to responses to demands and feedback from stakeholders and the public, which ensure continuous progress and generate momentum towards sustainability.

Moderate transformative impact is achieved through more systemic elements. These include, for example, the structure of information flows or feedback loops. In the museum, this applies to the introduction of strategic sustainability management and an emphasis on standards, which can accelerate organisational change and enable the resolution of core problems within the museum. The greatest potential lies at the deep level (Göpel 2020). According to this view, changing values is at the core of any transformation.

In order to contribute to a Great Transformation, museums must transform themselves from inward-looking to outward-looking institutions – a platitude in the discourse on the dynamics of change in the museum sector as well as in museum practice. This outward-looking approach is enabled through a focus on the impact of museum work and requires that a distinction is made between internal and external sustainability.

Internal and external sustainability

When discussing sustainability in the museum sector, it is helpful to distinguish between an internal and an external perspective. Internal sustainability

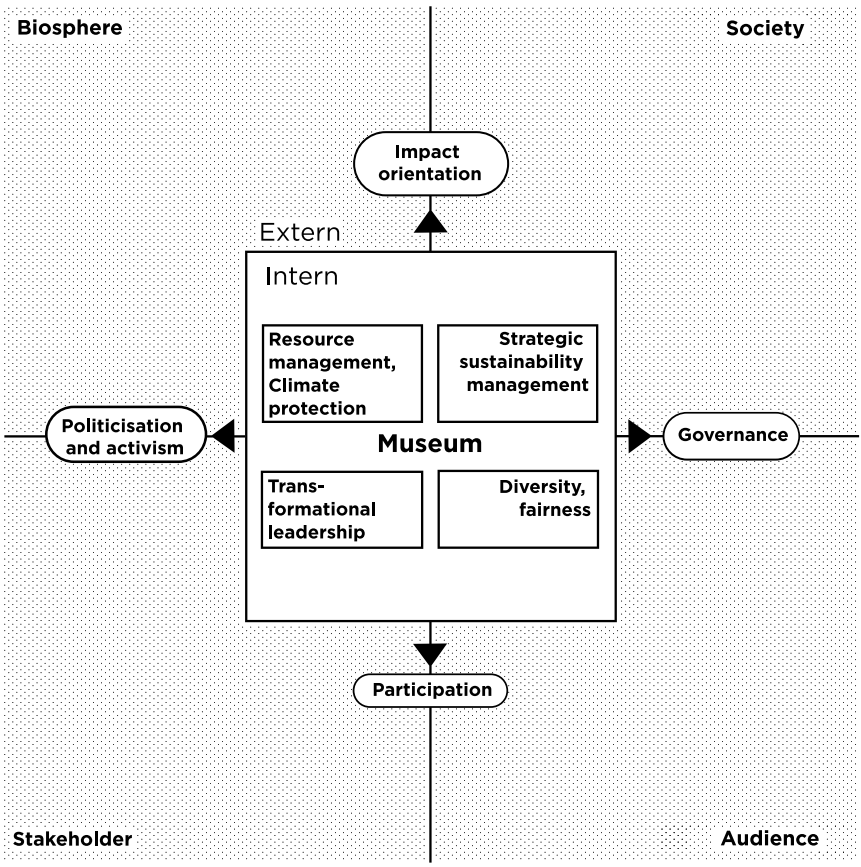

Figure 3.3 Internal and external sustainability.

refers to the sustainability of an institution, its operations and internal processes. An example of this is reducing energy consumption. External sustainability refers to the influence of the museum on sustainable development outside the museum. This includes impacts on visitors, other stakeholders, societal processes and the sociopolitical system as a whole. The contribution that museums can make to a Great Transformation thus consists primarily of measures in the area of external sustainability.

Nevertheless, internal sustainability measures can also contribute to a transformation outside the museum through various mechanisms, such as setting an example. In any case, in view of the global crises of the ecosystem, internal as well as external sustainability efforts contribute to the effort to remain within the planetary boundaries (see Worts 2019).

Approaches to achieving societal impact

Museums are ideally suited to contributing towards external sustainability, as they mediate between science, politics and society in their capacity as so-called border organisations (Lyth et al. 2017, 11). A key function of museums in terms of social impact is to facilitate public discourse. The specific resource provided by museums is the physical space, i.e. the museum building, where the public and various stakeholders can interact. In this way, museums can provide a place where visitors reflect on issues relevant to the Transformation and thus contribute to the formation of social capital (Lyth et al. 2017, 10). Museums can also function as a safe discourse space where public controversies can be discussed and addressed in a constructive way (see Cameron 2005, 229).

Through this discursive practice, a shared authority emerges between museums and their public in terms of knowledge, attitudes and values relevant to the Transformation. Enabling open-ended discourse and diversity in exhibitions contributes to this shared authority. In the spirit of a search and learning process, museums are encouraged to ask questions rather than providing answers through a prescriptive transmission of messages. Museums can thus be thought of as a forum where visitors discover meanings for themselves in a participatory way (Dodd 2015, 29).

Developing into an open discursive space in this way, and reflecting on the interpretive authority of museums as a result, is the starting point for increased social impact. Through participation in the broadest sense, museums can build a dynamic relationship with the public based on mutual listening and learning – and thereby also develop a more direct and stronger connection with society as a whole. This represents an opportunity for museums to further increase their impact, particularly those that are primarily designed – apart from educational programmes and special events – for quiet, contemplative enjoyment (Houlberg Rung 2021, 247).

In addition, museums can also develop very specific approaches to increasing social impact. This includes the concept of Boundary Work, or how

museums function as organisations at the border. So-called boundary objects are also important for this work. Boundary objects are repositories or collections of physical objects that facilitate the transfer of information and knowledge (McGreavy et al. 2013, 4199). Thus, museum collections can be perceived as boundary objects and understood as offering unique potential for social understanding.

Small museums can also contribute to the Transformation, especially if they reflect on their own role in the context of sustainability. Although small, local initiatives and many micromuseums are not formally recognised as museums, they bring something to the table that many larger institutions strive for: the participation of a broad social spectrum, strong local roots, a direct connection to the visitors' lifeworlds (Brown 2019, 6) – and thus a substantial impact. Aligning the interactions and participation processes that take place there even more strongly with sustainability issues and challenges in the future represents an opportunity for the museum sector as a whole.

In future, museums will function more and more as mediating actors and will assume greater social responsibility. Their unique potential for the Great Transformation lies in strengthening their role within the social system and becoming proactive operators in the political sphere. In this context, the local level is of particular importance, as Janes and Sandell explain. Museums can act as pioneers of social change above all when they develop sustainable futures for the museum sector and their local environment and thus become, in the best sense, an "activist museum" (Janes and Sandell 2019a, 1). The focus on external sustainability which this describes also entails a shift in the role of the museum from one "on the periphery of society to one that is now more widely respected by a range of different sectors and stakeholders" (Lyth et al. 2017, 10).

3.3 Agenda 2030 as a global frame of reference

The central frame of reference for all activities in the field of sustainability is provided by the UN Sustainable Development Goals (SDGs). These are global development targets which are to be achieved by 2030. They aim to deliver a better life for all people, both those living now and future generations. Numerous sectors are implementing measures in line with the SDGs, and UNESCO has pointed out the particular importance of cultural institutions in achieving these goals (United Nations Educational, Scientific and Cultural Organization 2018). Museums, too, can contribute to the achievement of the SDGs in various ways.

However, only a few museums have so far systematically developed their potential with regard to the Sustainable Development Goals (SDGs) (z.B. Lanzinger and Garlandini 2019). Most museums have been hesitant to operationalise the SDGs, possibly due to the fact that the goals are not designed in a way that suits their day-to-day business, which focuses on collections and visitors.

The SDGs in the work of museums

In order to make the SDGs fruitful for the museum sector, it is first necessary to analyse the interfaces between the individual SDGs and the work and impact of museums and how museums can contribute to each individual goal. If all the sub-goals of the 17 SDGs are related to areas of work in museums, a bewildering number of possibilities and starting points for museums quickly emerge. Notwithstanding this complexity and the difficulty of operationalising the SDGs for museum work, they also offer an opportunity that should not be underestimated. They are widely recognised, are for the most part also being promoted at the national level and offer a globally harmonised frame of reference. In this sense, they offer a motivating framework within which museums can become active, pay more attention to their social impact and initiate an internal transformation process. It can be useful for museums, especially when directly involved in a regional or national SDG process, to use the SDGs as an action-guiding framework for a transformation towards sustainability (Visser 2018a).

The most obvious point of reference for the museum sector is the task of protecting and preserving cultural and natural heritage. This concerns heritage in museums as well as protecting it in a wider sense. The understanding of heritage, i.e. something that is preserved for a subsequent generation, is directly linked to the idea of sustainability. Specifically, the conservation of cultural and natural heritage is listed as SDG target 11.4. In addition, museums contribute to numerous other SDGs, especially through knowledge gained from subject-specific collections; for example, Quality Education (SDG4), Industry, Innovation and Infrastructure (SDG9), Climate Action (SDG13), Peace, Justice and Strong Institutions (SDG 16), Reduced Inequalities (SDG 10), Life below Water (SDG14) and Life on Land (SDG15) (McGhie 2019, 45–46; Visser 2018b). The contributions to the individual SDGs are elaborated in this book and related to specific fields of work. In doing so, a museum-related and thus application-related perspective is used that is not based on the structure of the SDGs.

An obvious approach to working with SDGs in museums is to align the respective thematic focus, main collection or topic of an exhibition with the SDGs and to select one or two SDGs to which the greatest contribution can be made. The focus on one SDG can be temporary, for example for a part of the collection, or long-term, for example if the orientation of the entire museum suggests a link to a specific SDG (Visser 2018a). In general, museums can contribute to the SDGs with the following strategies and activities (McGhie 2019, 42): "(i) Protect and safeguard the world's cultural and natural heritage, both within museums and more generally; (ii) Support and provide learning opportunities in support of the SDGs; (iii) Enable cultural participation for all; (iv) Support sustainable tourism; (v) Enable research in support of the SDGs; (v) Direct internal leadership, management and operations to support the SDGs; (vii) Direct external leadership, collaboration and partnerships towards the SDGs". These starting points contribute in different ways and to different SDGs in each case.

The integration of the SDGs faces many challenges anyway, in addition to that of the complexity described above. This also includes the way cultural heritage is understood in the SDGs. Target 11.4 does not adequately reflect the challenges and opportunities of the cultural significance of museums for sustainable development and therefore does not go into sufficient detail. So-called shadow indicators can support target 11.4 (Petti et al. 2020, 20). In order for the SDGs to be achieved at international level, local activities and thus the involvement of local communities are necessary. In this context, the question arises as to how local activities can contribute to the achievement of the SDGs at national and international levels and also how they can be made quantitatively visible. This is especially challenging for the museum sector, as the field of natural and cultural heritage is extremely complex and diverse. The contribution of local activities in the museum sector is difficult to measure, as international and local values with respect to natural and cultural heritage may differ (see Petti et al. 2020, 1). Translating and applying the SDGs to local contexts is very demanding, as locally evolved cultural contexts may not be readily compatible with the analytical approach behind the SDGs. This requires a translational exercise for which museums seem ideally suited (United Cities and Local Governments 2018, 35).

The blind spots in Agenda 2030

Important as Agenda 2030 is as a political frame of reference, it cannot function as the ultimate vision for museums, as the SDGs emerged in a multinational negotiation process and therefore do not go into sufficient detail regarding many aspects of museum work.

A key criticism of the SDGs from the perspective of museums is that the North–South relationship is barely addressed on a global level. In particular, the consequences of global colonialism and the resulting responsibility borne by the Global North are only discussed at the margins – and yet precisely these issues would be of great importance for a re-contextualisation of collections. The SDGs fail to fully exploit this opportunity to initiate a worldwide movement for change. Furthermore, the SDGs refer to relative, rather than, absolute reductions in resource use. This relative reduction does not reflect the necessity for an absolute reduction and therefore leaves open the possibility of unsustainable economic activity and unsustainable consumption patterns in the future. The SDGs thus only explicitly aim at a strictly limited societal transformation (Eisenmenger et al. 2020, 1106). The transformative potential of the SDGs could be strengthened if the museum sector were to interpret the targets and indicators with respect to its own work in such a way that, for example, absolute reductions as well as practical impacts on transformation were to be pursued (see Hajer et al. 2015, 1656).[1]

A fundamental criticism of the SDGs concerns the targets and indicators, which prioritise economic performance and growth over global environmental

impacts (Eisenmenger et al. 2020, 1104). For many regions, economic development and rising incomes – including through museums – remain important goals. But especially in the industrialised nations and the museums located there, the focus from the perspective of strong sustainability would have to be on a post-growth strategy.

3.4 Participatory science as social context

Museums not only ensure the conservation of human heritage, they also generate and transmit knowledge on the basis of their collections. Today, unlike in the information society (see Masuda 1983), the transmission of knowledge plays only a subordinate role, because knowledge is available online very quickly, very easily and virtually everywhere. Moreover, the stock of knowledge is adapted and revised at ever shorter intervals and therefore requires continuous updating. In addition, the increasing complexity of scientific findings makes them more and more difficult to interpret, meaning they often remain worthless for lay people without further contextualisation. Furthermore, information and knowledge are increasingly easy to manipulate, which is why "alternative facts" are having an increasing impact on social discourse.

This loss of significance of knowledge for the individual is taking place within a context in which the significance of science for society is growing. Scientists increasingly act as advisors on sociopolitical governance issues. Their findings are having an ever-deeper impact on political decision-making processes. This places science and research at the centre of our shared life and democracy (Bäckstrand 2003, 33).

This development calls for some reflection on the social relevance of knowledge and science. For lay people and society as a whole, basic scientific competence, a scientific literacy, is becoming an important skill for a participation in the social discourse, which is increasingly shaped by science. Even if the demand for a broad basic scientific education is not new, the established criticisms (see Shamos 1995) must at least be re-evaluated against the background of the recent developments outlined. In future, an understanding of the "scientific method" and the research process as a whole will be increasingly important. This means that a society is emerging that is based less on information and knowledge and more on science, because it is precisely in addressing global challenges that science and problem-oriented research play a key role.

Public science for the governance of a sustainable democracy

The multiple crisis and the guiding principle of sustainability make scientific knowledge necessary for the development of control mechanisms and solutions. Problem-oriented research, or "postnormal science" (Funtowicz and Ravetz 1993), takes this as its starting point and translates the global and

societal challenges into scientific questions. Researchers thus operate at the interface between scientific advice and policy formulation (Jasanoff 1994, 230). In this context, scientists can also engage in agenda-setting in the political discourse (Ingram et al. 1992, 46). One consequence of this is that the interface between science and decision-making must be reinterpreted. In addition to researchers, experts and politicians, citizens must also be involved in this process (Bäckstrand 2003, 25).

Broadening the overlap between science and politics also goes hand in hand with a fundamentally open approach to science. This allows scientific knowledge to be considered a common good against the backdrop of today's global challenges (Bäckstrand 2003, 25). The resulting scientific way of working has a stronger basis in democratic processes and is characterised by deep participation (Funtowicz and Ravetz 1993, 754). This raises the fundamental question of how people can be empowered to participate more fully in today's science-driven society.

The participatory science society of the future

The aspiration towards achieving sustainable development and the promotion of a robust democracy require a transition from a knowledge society to a participatory science society. The participatory science society is characterised by a problem-oriented, transdisciplinary understanding of research and by processes and results that are openly accessible as a matter of principle. This kind of science is also characterised by a culture of critical reflection. Critical thinking and fact checking are also in direct opposition to the post-factual society, while clear reflection on the history of science and on epistemology reveals that science is also a cultural process. The democratic implications of such a society manifest themselves in a culture of discussion that contributes to the formation of individual opinion and within which controversial issues are dealt with in open negotiations. If the crisis of democracy is due to a deterioration in the political culture, then the participatory science society can contribute to a "third Enlightenment" (Hampe 2018) and support a democratic culture. Wicked problems in particular, given their normative components, require a discourse that is embedded in social practice. The basic prerequisite for such a discourse is open and participatory science. The interface between citizen science and transdisciplinary research on the one hand, and democracy education and deliberative democracy (see Gutmann and Thompson 2004) on the other, offers opportunities for the future that still need to be exploited. By integrating such a deliberative approach, museums can also act as mediators in decision-making processes and thereby strengthen their role in sociopolitical contexts (Cameron and Deslandes 2011, 147).

As a utopian project, sustainability is at risk of failing above all because of social inequalities, rejection and a lack of willingness to cooperate. A participatory science society can therefore contribute to a sustainable future by:

- promoting dialogue and cooperation between scientific experts and citizens;
- addressing the complex global issues and laying the ground for decisions that take place under conditions of great uncertainty through collective processes of knowledge acquisition;
- facilitating a basic understanding of the contingency and interpretability of scientific results and their significance for the recommendations for action derived from them;
- promoting greater transparency for scientific findings, especially at the interface with political decision-making processes;
- encouraging reasonable expectations with regard to what science can and cannot achieve;
- strengthening trust in science and researchers;
- promoting fundamental communication about the advantages and limitations of rational thinking – and establishing a clear idea of the place that traditional forms of knowledge acquisition can have in it;
- empowering citizens in ways that go beyond the right to vote and creating different opportunities for them to engage in important societal processes.

The epistemocracy that is sometimes called for (Bogner 2021, 110), i.e. a kind of rule of knowledge, entails numerous imponderables and dangers for democracy. The opening up of science and politics outlined here could start by introducing a more discursive and also controlling element. In this way, it would strengthen democratic structures for the task of dealing with global challenges. Museums can contribute to this by enabling citizens to become involved in scientific discourse.

Museums as key actors in the science society

Museums traditionally combine research with communication activities and are therefore suitable not only as sites of knowledge transfer but also as sites of interaction and participation within the framework of a science society (see Silvestrini 2013). In the context of a participatory science society, museums are particularly suited to develop into institutions that mediate and facilitate exchange between scientists, experts, politicians and lay people. In this way, they can lower the threshold for the participation of the general public in science (Bandelli 2016, 138–142). Museums can serve here as a market place, a public meeting space for citizens, a new type of agora (Einsiedel and Einsiedel 2004, 73). Museums will then re-prioritise their communication mission to facilitate exchange between scientists and lay people and to provide multiple opportunities for participation. This in turn will require the development of new infrastructures and new posts for staff in the institutions.

Against the backdrop of overwhelming problems and increasing complexity, an increasing number of citizens are retreating into subjectivity, partly in

order to free themselves from a perceived domination by knowledge. Museums, with their very specific way of depicting and questioning reality and history, can be understood as an alternative social space where the public is offered unique access to a participatory science society. Museums can thereby cultivate a specific truth practice (Hampe 2018, 34) and contribute to an enlightened culture. In this way, they complement traditional scientific perspectives and encourage visitors, using particularly effective means, to be active citizens.

In a participatory science society, the importance of museums as key places where science, democracy and global futures can be experienced in person is increasing. Museums thus serve to promote social cohesion and strengthen democracy and contribute to political decision-making processes. In this prominent role, the museum serves as a magnifying glass for the scientific process of knowledge acquisition, for developing societal momentum and for political governance for a sustainable future.

Note

1 The vision of the sustainable museum is based on the transfer and adaptation of ideas, concepts and findings from other disciplines and contexts to the museum sector. Such examples of institutional transference to museums – as here from general research on SDGs – are referred to in the footnotes.

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4 Three levers for the transformation

In order for the vision of the sustainable museum to become reality, it is helpful to identify those aspects, approaches and measures that have a particularly strong impact on the intended transformation. How can museums act as multipliers? How can they exploit their specific potential for social change? The following chapter develops, from a cross-sectional perspective, different approaches that can be effective as levers for the transformation of the museum sector (see Figure 4.1).

4.1 The illusion of neutrality and political activism

Museums that advocate for sustainability and a future worth living for everyone cannot remain politically neutral. In order to drive the necessary social change, museums must therefore add political engagement to their core tasks. Advocacy around issues to which museums can contribute contextualisation and specific insights can even be seen as a social duty for museums. The outward orientation this suggests, i.e. the focus on social impacts (as against an inward orientation, i.e. the optimisation of the operation of the institution from a sustainability perspective), is the most important aspect when it comes to supporting social transformation (Janes and Sandell 2019, 15–16).

Neutrality and value orientation in museums

Is it appropriate for museums to express an unambiguous commitment to certain values? Or are they obliged to remain neutral? Many museums have so far seen themselves in a neutral position and have not directly addressed social challenges (Janes 2015, 3). The rationale for museums not taking sides in conflictual discourses was often based on their not having either the knowledge or the means to address these additional new questions and issues (Lyons and Bosworth 2019, 175). Another reason why many museums have so far insisted on their neutrality is the fear of offending potential donors, whether public or private, and thereby endangering their own financial stability (Janes 2015, 3). Depending on the national legal situation, quasi-political campaigning can even contravene the charitable status of museums (Miller et al. 2004, 90). This position is also supported by a study in which a majority

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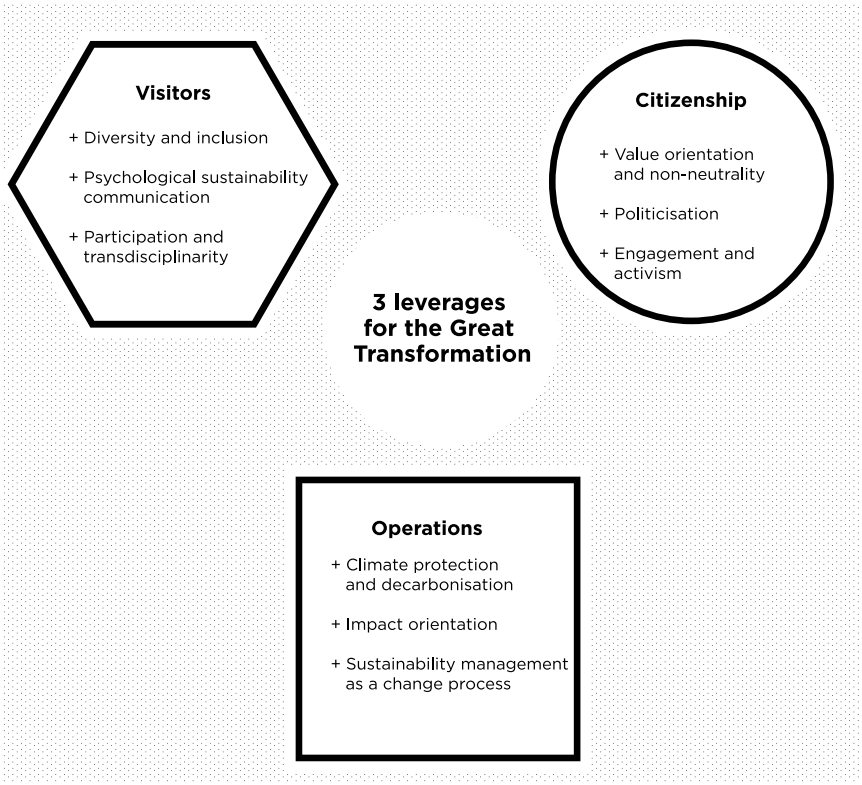

Figure 4.1 Museums and the Great Transformation.

of respondents said that museums should not be opinion leaders and should not adopt a specific point of view (Cameron 2005, 226).

A neutral stance on the part of museums with regard to practical problems of sustainability usually means that museums remain inactive and do not contribute to the solution of a problem. With regard to crises such as climate change, however, inaction can no longer be considered neutral behaviour, but constitutes in itself a partisan act (Rodegher and Freeman 2019, 341). The vision of a sustainable museum thus requires reflection on the values that should underpin future museum work (see auch: Cameron 2005, 222; Janes 2015, 4). The expectations placed on museums by different stakeholders can also be seen as a call to open up and to take a clearer position on controversial issues in the sociopolitical discourse. Against this background, it seems not only advisable but even imperative to consciously and openly communicate the fundamental values as well as the ideological, political and cultural framework shaping the work of museums. This can only strengthen the reputation and credibility of museums in the future (Evans et al. 2020, 19–21).

Museums as scientific institutions are based on gaining knowledge through scientific methods. Although natural science in particular tries to be objective,

it can never be neutral. Natural science does not discover universal truths either; its results are always influenced by the framework within which it operates (see Chapter 8.2). Such an understanding of natural science suggests that museums can never be neutral, and indeed never have been. Museums in the past often appeared to be objective and neutral because their underlying values were unconscious, or at least were not openly and transparently communicated to the public (Evans et al. 2020, 19). Conscious or unconscious values in museum work also shape important narratives that can have an impact on society and thereby contribute to how history, the present and the future are perceived. These narratives thus also represent an important basis for social behaviour and can hinder or further change (Janes and Sandell 2019, 8). In this sense, all the activities of a museum can in principle be seen as political (Ashley 2014, 274).

It is often argued, on the other hand, that the role of museums is rather to stimulate critical thinking, to trigger discussion and to contribute to the formation of opinions by providing information, and thus to enable people to make their own decisions on important social and global issues (see dazu Cameron 2005, 226). Thus, museums can potentially contribute greatly to social change by handing over responsibility to visitors and letting them decide for themselves which issues are important to them and draw their own conclusions (Cameron 2005, 229). But this understanding of museums as enablers of independent thinking and critical reflection is irreconcilably at odds with the conviction that museums can never be neutral. They never present only facts – and sustainability as a normative concept demands that museums take a stance.

However, the post-neutrality of museums also presents many opportunities, because political neutrality for museums always limits their capacity to promote societal transformation (Lyons and Bosworth 2019, 174). A clear stance offers an opportunity to focus more on the positive impact that the museum has on society and thus to communicate more clearly (Evans et al. 2020, 23). Such an open approach to the values underlying museums in general, and the work of scientists in museums in particular, also represents an ideal starting point for reflecting on the social contingency of natural science and for positioning museums as a key actor in a participatory science society (see Chapter 3.4). Museums can use this publicly led reflection process to:

- contribute to the discussion of controversial issues,
- provide orientation in a post-factual society,
- help people to form their own opinions.

This new focus on values in museums also offers opportunities for internal development processes. The adoption of specific values has an impact on the museum in that it influences the norms and behaviour of the staff, thus shaping the entire working culture. The influence of values on the role of management and on management style is even more direct (Davies et al. 2013,

354–356). For example, studies have shown that altruistic management values contribute to an institutional shift towards sustainability (Florea et al. 2013, 393). Values such as unselfishness, respect and empathy among management and staff contribute to a more flexible and agile organisation, as support, cooperation and compromise shape the working process and set off reactions. The communication of personal expectations and goals that this enables also results in a higher level of personal responsibility and a cooperative organisational style with flat hierarchies (Florea et al. 2013, 399–401). Against this background, the challenge for management is to develop authentic measures that address and promote fundamental and very personal qualities such as selflessness, empathy and a sense of fairness.

If museums are required to openly communicate their underlying values, then sustainability could be defined as a new core value of museum work (Evans et al. 2020, 22). For such openness goes hand in hand with an understanding of justice, transparency and cooperation as the foundations of sustainable development.

Engagement and political activism

In order to advance sustainability as a political project within society as a whole, there is a constant need for committed and competent supporters. These partners bring their own specific competences and perspectives to the political project (Lafferty 2004, 10). Museums can become this kind of actor for the process of realising sustainability. Also, the implementation of sustainability policies is made more difficult by individualisation, fragmentation and segmentation in society, because these tendencies reduce overall the scope for managing democratic processes (Bressers 2004, 285–286). Sustainability counters this through mutual and cooperative approaches. As a social space, museums can contribute to this in many ways.

Museums also have political relevance, as they are inevitably integrated into a sociocultural and political environment within which they must operate. But museums are also political in a very practical sense, and in many ways. For example, they play a role in political processes such as globalisation and post-colonialism, and through their functions and position they have the power to influence identity formation (Stylianou-Lambert and Bounia 2016, 22). National museums are a particularly striking example of this, as they can be used by governments to develop narratives of the nation, to contribute to identity building and at the same time to further specific desired economic effects and developments (Gray 2015, 27). In this way, museums can be used as models to show how social, cultural and political struggles take place in society as a whole (Macdonald 2001, 16). Clearly, different types of political activity and engagement affect the way museums operate. Political actors influence what is expected of museums, what they actually do and how they interact with different groups (Gray 2015, 150). Museums are both political in themselves and at the same time they are influenced – both individual institutions and the sector as a whole – by actors in the political sphere.

Furthermore, museums impact on the political-scientific-cultural context in various ways. For example, they consolidate and integrate many disciplinary bodies of knowledge. They also contribute to the establishment of scientific and artistic narratives and interpretations. And they provide a place where individuals and groups can articulate and interrogate their subjective perspectives and return to the political sphere with new perspectives (Luke 2002, 223). The social negotiation of the interpretation and meaning of the past is largely in the hands of museums. They thereby make a crucial contribution to the development of collective identities and thus also have a very tangible influence on political action in the here and now as well as on our thinking and planning with regard to the future (Stylianou-Lambert and Bounia 2016, 21).

The political role of museums has been accurately analysed by Gray and is outlined below following his work (2015). The importance of museums, not only because of their practical tasks, but because of their symbolic significance for society, shows that the current lack of political centrality is not due to the museums themselves (Gray 2015, 169). Although museums do indeed play a central cultural role, they are predominantly recognised by key political actors as not really important. This is especially true for countries where the museum sector is largely privately funded. Overall, there is a discrepancy between the importance of museums for sociopolitical processes and how they are represented in political systems (Gray 2015, 166).

> The inability of the museums sector to establish a clear political role for itself has left it in the position that it is not really taken very seriously by political actors whose policy concerns are seen to be of far greater significance than are those of museums.
>
> (Gray 2015, 155)

This depoliticisation of the museum sector offers specific benefits, but also entails a number of political risks. The advantages include the emergence of organisational forms and practices that are, on the whole, relatively independent of political interference. This depoliticisation thus enables museums and their staff to perform their social function in relative isolation. The associated disadvantage is that the sector is comparatively neglected and may find it more difficult to obtain or secure funding (Gray 2015, 155; 169). This depoliticisation also means that museums do not feature as active actors in the political sphere. This often renders them mere objects in the calculations of other political interests. It also means that their services to society, culture and politics are undervalued or ignored. As a result, other political actors tend to regard museums as marginal and do not give them the recognition appropriate to their contribution to society (Gray 2015, 168).

It follows from Gray's observation that in order to contribute to a transformation to sustainability, museums need to redefine their role as actors in the political arena. This step is long overdue. Advocacy, activism and political

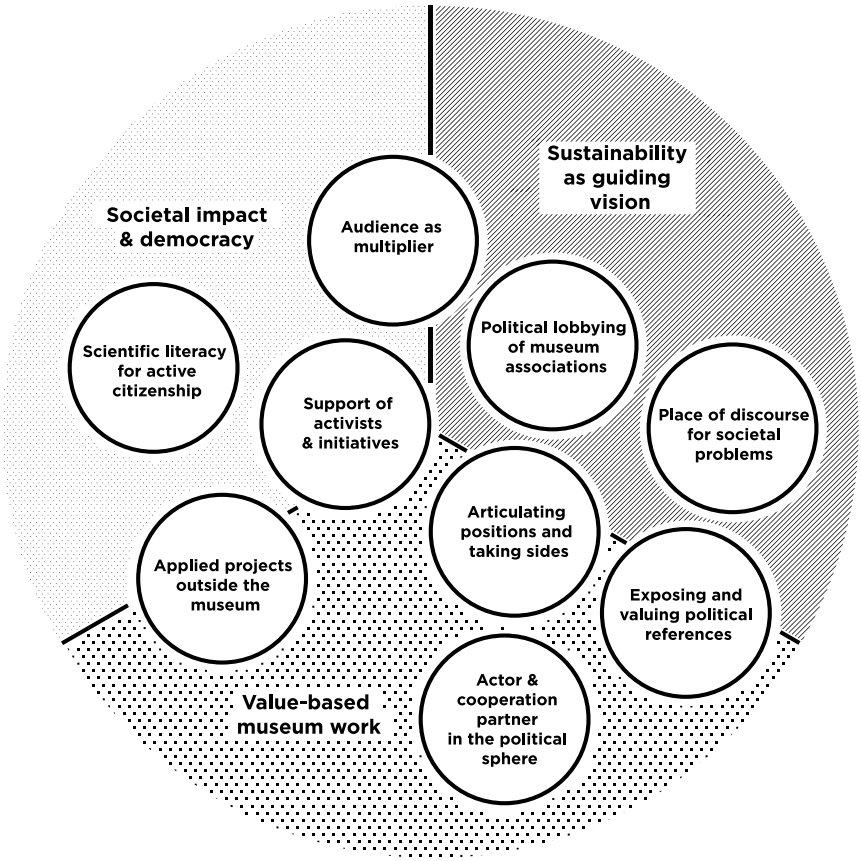

Figure 4.2 Politicisation and activism in the sustainable museum.

work will become a significant field of activity for museums and museum associations in the future (see Figure 4.2).

In order to advance sustainability in the political sphere, it is necessary for it to be embedded institutionally. Museum associations can make a contribution to this, as they are not only important as participants in political discourses, but also and especially in framing and political agenda setting for the entire sector (Gray 2015, 162). At the same time, it is not sufficient to address sustainability aspects in the work of associations on a sectoral basis – e.g. through existing specialist groups within associations. There needs to be a body or initiative set up specifically for the purpose of embedding sustainability in museum interest groups and associations, one which is suited to the transversal character and long-term nature of the task. It is only in this way that a mutual integration of the new requirements between the different professions and the diversity of institutions in the museum sector can succeed (see Heinrichs 2013, 241–242).

4.2 Climate protection and decarbonisation

Climate change is one of the greatest global challenges of our time, which can only be met through the joint efforts of all social actors. It follows that a vision for the sustainable museum must also include at its core actions for effective climate protection and decarbonisation of the museum sector.

Compared to other cultural institutions, museums produce relatively high CO_2 emissions and thus contribute to the climate crisis to an extent that should not be underestimated. A large proportion of the CO_2 emissions from museums is caused by energy consumption due to the complex heating, ventilation and air-conditioning and refrigeration technology (HVACR) as a whole. Other emissions are caused by waste, water consumption and business travel. The complex air-conditioning technology is necessary due to the conservation requirements for the storage and presentation of the collections. The extensive storage facilities and archives in particular need to be taken into account here (see Chapter 7.3).

Climate protection in museums must therefore start with facility management; it aims to reduce energy use and ultimately achieve CO_2 neutrality. Calculating the climate footprint is a useful tool for this.

Calculating the climate footprint of museums

Accounting processes can include different perspectives and can be applied to different areas. While environmental or ecological accounting covers all environmental impacts, climate accounting takes into account only the climate-relevant impacts, in particular greenhouse gas emissions. It can be applied to entire countries, individual branches of industry, regional or local corporations such as counties or cities, companies, institutions such as museums, or even individual temporary projects such as events. For climate accounting, it is important to differentiate between different terms: a carbon footprint refers only to CO_2 emissions, a greenhouse gas footprint to all greenhouse gases, and a climate footprint includes all greenhouse gas emissions as well as all other activities that impact on the climate. A climate accounting process quantifies the emissions of greenhouse gases in metric tonnes of carbon dioxide equivalent (tCO_2e). There are various standards and guidelines for the preparation of climate accounts. These include the DIN ISO 14060 series of standards and the PAS 2060 on climate neutrality. In contrast to other sectors, there is currently no global standard for calculating the climate footprint of museums. However, there are good initial ideas at the national level as well as for specific activities such as loans (see Lambert and Henderson 2011). In any event, the Greenhouse Gas Protocol (GHG) (World Resources Institute 2004) can be regarded as a global frame of reference. When museums undertake a climate audit, they should therefore always follow the GHG. This will also ensure that procedures and results are comparable across the museum sector.

As the first step in any museum climate action programme, clear targets need to be defined. For setting targets for the reduction of greenhouse gas

emissions, it makes sense to link them back to the goals of the Paris Agreement. Such reduction targets for museums can also be described as science-based targets. In setting targets, a distinction can be made between a target of "well below 2°C global warming" and a target of "maximum 1.5°C global warming" (Giesekam et al. 2021, 1657). However, linking them to national reduction targets can be difficult, as these are based on emissions in previous years, and such a database is usually not available in museums.

To ensure the validity of an accounting exercise, both the elements that are included and those that are excluded from the exercise have to be defined. Climate accounts include all the most important greenhouse gases such as CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride and sulphur hexafluoride. Setting the accounting parameters in this way also addresses the question of what kind of emissions the museum can influence in the first place. In order to understand the basic idea of the instrument of climate accounting, the specifications of the GHG accounting parameters are essential. Emissions are differentiated there according to their origin into three "scopes". Scope 1 covers direct greenhouse gas emissions from combustion processes in systems used at the site of the museum, for example, heating systems and vehicles. Scope 2 covers indirect greenhouse gas emissions from the use of electricity and district heating. Scope 3 covers all other indirect greenhouse gas emissions. This applies both to upstream and to downstream activities related to the running of the museum, such as emissions from transport (of exhibits), business trips and staff commuting travel, or waste disposal services. The total emissions of all goods and services purchased are also included under Scope 3. To make it easier for organisations to make these calculations and to further specify the accounting parameters, the GHG recommends limiting the analysis to those processes that can be controlled or managed by the organisation. In addition, a distinction can be made between the operational control approach, the financial control approach and the equity share approach (World Resources Institute 2004, 16–17). The system boundary for each museum is determined based on these parameters. However, it is usually too time-consuming and therefore not practicable for museums to identify all emissions within the system boundaries. A pragmatic approach is therefore to identify the main sources of emissions, i.e. the sources that contribute a very large proportion of total emissions, as well as all sources that the museum can influence directly.

For a GHG-compliant report, all emissions caused by the organisation itself (Scopes 1 and 2) must always be included. Emissions generated by service providers and others (Scope 3) can be included in the report on a voluntary basis (World Resources Institute 2004). Scope 3 emissions are much more difficult to capture than those under Scopes 1 and 2, which is why the relevance of the emission sources in Scope 3 must be examined particularly closely. If there is no reliable data on these emissions, they can at least be covered by qualitative statements in the reporting under Scope 3. Most countries, companies and sectors focus on Scopes 1 and 2 and ignore the third area. This is understandable, as emissions in the first two areas are not only

easier to collect, but also easier to control. Museums usually have direct control over emissions in areas 1 and 2, but the largest emissions are often caused in the third area, which also includes emissions by service providers and the public.

Once the accounting parameters have been defined and the main sources of emissions identified, the data collection can begin. First of all, all those activities within the museum's operations are identified through which greenhouse gases are emitted in line with the previously defined specifications. Then the relevant consumption data are researched and collected. If data collection is not possible, reasonable estimates can also be used. Climate accounting is therefore always a trade-off between the need to collect robust data and the proportionally increasing difficulty of more accurate data collection methods. This is followed by the actual calculation of the greenhouse gas emissions caused by activities and consumption. For this purpose, the available data is converted into equivalent amounts of CO_2. Various online calculators and databases are available for this calculation.

Another reason why climate accounting for museums is a difficult task is that there is often a lack of relevant comparative data from other museums. Evaluation systems based on consumption data from other types of buildings can in theory be used for comparison. However, museums often perform very poorly in comparison, because the relative energy consumption intensity (energy consumption per unit of area) is often disproportionately higher in museums than in other buildings due to the indoor climate requirements for the collections and for visitors (Sutton 2019, 431).

Based on the results of the climate audit, those activities and operational fields of the museum are identified which, on the one hand, are particularly relevant in terms of climate emissions and, on the other hand, can also be influenced directly or easily. The results can thus be used to develop packages of direct measures for climate protection at the museum and to incorporate them as a sub-area within a comprehensive sustainability management system (see Chapter 11).

From climate accounting to ecological footprinting

Decarbonising museums contributes to tackling climate change, but does not address crisis phenomena such as pandemics, migration, biodiversity loss or social inequality. An ecological modernisation of the museum sector that focuses on the reduction of CO_2 emissions and on climate protection is therefore not enough. Climate accounting and energy efficiency improvements are important instruments. However, a broader analysis of the environmental impact of museums is a more effective approach for achieving greater ecological sustainability.

One tool for this is calculating the ecological footprint (Wackernagel and Beyers 2019) of museums. The ecological footprint is an indicator of anthropogenic pressures on ecosystems in general, i.e. not just on the climate system. It is a measure of resource use and its environmental impact. To calculate

the ecological footprint of museums, resource consumption is broken down into five consumption categories. The difficulties regarding the definition of accounting parameters apply here just as much as with climate accounting. Although this approach presents some methodological challenges (Wiedmann and Barrett 2010; Galli et al. 2016), it can be helpful for museums as it is widely used and there are many associated tools and applications in existence. The barrier to entry is therefore lower than for other environmental accounting tools.

Climate protection addresses only part of the ecological impact of a museum, and ecological sustainability is only one small aspect of the complex vision of a sustainable museum. Because climate change is one of the most pressing global problems, it nevertheless seems sensible to place particular importance on this instrument within sustainability management. Not least because the reduction of climate emissions from museums is in itself an important contribution to climate protection. Against the backdrop of these quantitative measures and tangible successes, however, the long-term, indirect, qualitative and more difficult-to-measure impacts of research and education undertaken by museums should not be neglected – nor their multiplier effects on visitors and other stakeholders.

4.3 The public as change agent

Museums are more successful at connecting different spheres and aspects than almost any other sociopolitical actor – connecting science with art, history with visions of the future, artefacts with virtual realities. They therefore have a unique capacity, as public-facing institutions, to contribute to a societal transformation towards sustainability.

If a profound transformation of the entire society is necessary to overcome the global crises, then people play the central role in this process. Working with the public is therefore the crucial lever by means of which museums can support transformation. To make museum work more effective in this cause, museums must be situated at the heart of society as places that are welcoming and open to all.

Diversity, inclusion and disadvantaged target groups

For many people, museums have always been associated – even if not intentionally – with barriers to access. The social dimension of the sustainable museum requires the integration and welcoming of specific target groups who have previously, for a variety of reasons, found it difficult to access museums.

Inclusion can be understood as the endeavour to communicate better with potential visitors who are traditionally underrepresented among the visiting public. The aim is to enable them to visit the museum or to motivate them to come (Sandell 2003, 47). So it is about breaking down symbolic, social and physical barriers to access (Kinsley 2016, 486). Improved accessibility and

audience development are the driving forces of these endeavours. Inclusion, in a broader interpretation, can also be understood as a participatory process involving other stakeholders in the work of the museum in the framework of governance or through other forms of participation (Sandell 2003, 47). Inclusion is directed inwards as well as outwards, analogous to the twin perspectives of internal and external sustainability. Inclusion and the promotion of diversity thus affect not only the socio-demographic structure of the visiting public, but also the museum staff. This also creates a positive, self-reinforcing momentum, because the museum, as a social system, is essentially defined by people – visitors and staff. Greater diversity and inclusive practices thus lead to a shift towards cooperative museum work with varying target groups and thus, in the medium term, to a change in traditional ways of working in the museum (Taylor 2017, 160).

Underrepresented and disadvantaged groups include people who do not live in cities or who do not have the opportunity to travel there, as well as people who do not have the financial resources to visit museums. Thus, museums as leisure facilities are per se exclusionary for precariously employed people who cannot take time off to visit. And an inclusive approach will include educationally disadvantaged milieus as well as groups for whom a visit to a museum is unusual and who basically have no reason to change this (Reeve 2006, 56). However, inclusion and the pursuit of diversity will also focus on generally socially disadvantaged and discriminated groups and minorities. This includes potential visitors from ethnic minorities (e.g. immigrants) or people who are discriminated against because of their skin colour (People of Colour) or sexual orientation (LGBTIQ+). Museums can reach these potential visitors particularly successfully through cooperation and partner programmes with other initiatives and institutions (Koster and Baumann 2005, 91). Programmes developed in cooperation with partners outside the museum can be particularly effective in reaching out to disadvantaged target groups.

However, inclusion and the promotion of a more diverse audience are dependent on many factors and can have many pitfalls. An inclusive approach must not only improve accessibility and integrate, for example, migrant or queer perspectives, but must also explore the root causes of exclusion (Sullivian and Middleton 2019, 108). An inclusive approach should therefore not only aim for greater diversity in the museum, but also for reflection and discussion on the reasons for and possible solutions to disadvantage and exclusion. In the worst case, inclusion can seem to be imposed from outside and to perpetuate power asymmetries and disadvantages. It is difficult to recognise such effects at an early stage, as they often occur unconsciously (Ng et al. 2017, 143). If the recognition of marginalised groups is not genuine, attempts to promote inclusion can also remain unsuccessful for many years (Kinsley 2016, 487).

Comprehensive inclusion is an ideal way for museums to fulfil their function as social multipliers. They can become ambassadors to particular segments of the public and to specific social milieus by increasing diversity

among visitors and staff (Coleman 2018, 28). In this way, museums can contribute to communicating the guiding principle of sustainability to specific social segments and target groups and to driving forward the Transformation.

Good practice

Building a bridge: Equity and diversity in museums

Museo Moderno, Argentina

Through exhibitions and programs, the Museo Moderno has the opportunity to face biases and focus on community building, inclusion, equity and diversity. To this end, the museum is committed to becoming inclusive and accessible for all the communities. The museum started in 2016 by creating a community outreach area within the Education Department, in order to be inclusive. In 2018, the building was refurbished to meet accessibility standards, which included, for example, the incorporation of a new education room with accessible restrooms, two new elevators with sound signals and Braille buttons, new galleries with natural light. In 2021, the museum installed a wheelchair elevator to access the shop and café, as well as tactile maps for the blind on every floor providing detailed information on how each gallery is distributed. These maps can be easily adapted to cater for each exhibition.

This transformation, encouraged by the Director and her senior staff, required interdisciplinary team involvement. Therefore, an accessibility plan has been designed, which includes training sessions for the staff, with a particular focus on visitor experience and exhibition design. The production, curatorial and visitor engagement teams are strongly committed to adopting accessibility practices throughout their different stages, from exhibition planning and design to installation and assembly. This has proven to be most challenging. The exhibition design team is working hard to better understand the various audiences' needs and design accessible devices accordingly and they have teamed up with artists so that many of their works of art can be tactile and multi-sensory. Additionally, a new accessible signage system is also underway.

The slogan "Nothing About Us Without Us" has inspired the museum to create partnerships with the community and organisations that support people with disabilities to better understand their needs and to develop long-lasting bonds Museo Moderno also produced the museum's first easy-read texts for the upcoming exhibitions. Audio and video guides will also be available to encourage autonomous gallery tours. Likewise, the museum's website has been renewed to include specific information, subtitles and image descriptions. The Education Department is carrying out in-person and/or online activities to promote integration

with teachers and local artists – many of whom have a disability – including sign language tours and tours for the blind.

Considering the potential of culture and intercultural dialogue as means of achieving sustainable development, the UN SDGs and with focus on the Universal Declaration of Human Rights, which states that "everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits", the Museum's ultimate goal is to welcome all visitors to enjoy the same unique experience. A challenge Museo Moderno has enthusiastically and gradually risen to achieve.

Contributed by
Marina von der Heyde and Patricia Rigueira

Sustainability communication in the museum

Sustainability communication can constitute a fundamental way of implementing change within museums as well as contributing to transformation outside the museum. Scientific knowledge and the discourse around research and science play a central role in this process of communication and negotiation. The task of sustainability communication lies in introducing an understanding of the world, that is of the relationship between humans and their environment, into social discourse, developing a critical awareness of the problems about this relationship and then relating them to social values and norms (Godemann and Michelsen 2011, 6). Sustainability communication uses different instruments and methods, such as strategies of empowerment, participation or social marketing (Godemann and Michelsen 2011, 9). Although museums have also experimented with types and instruments of sustainability communication that address broader target groups emotionally and individually and have a clear reference to everyday life (Fischer et al. 2020, 38), they have hardly ever been explicitly regarded as places of sustainability communication to date.

Sustainability communication in museums faces multiple challenges. Sustainability is a normative concept based on the fundamental principle of inter- and intragenerational justice, one that requires museums to take a stance. For sustainability communication, the normative character of the guiding principle of sustainable development means that discourses must not only be based on rational arguments, but also on values and moral intuitions. Visitors are thereby encouraged to reflect on their own preconditions and interests just as on the effects of their behaviour (Ott et al. 2011, 24).

Other challenges for communications include the invisibility of the underlying causes, the temporal and spatial distance to the effects, the lack of direct experience of the effects, the fact that any positive effects brought about by individual behaviour change are barely perceptible, the fundamental complexity and uncertainty, the limits of one's own perception, and the fact that one's own interests are affected (Moser 2010, 31).

For museums, this raises the practical question of how to deal with long time horizons and with the results of futures research in general, and how these can be integrated and communicated in exhibitions. The aim of related communications in the museum is to enable visitors to deal constructively with complexity, which is often unmanageable for the layperson. Another challenge is dealing with uncertainty. Here it is important to communicate uncertainties openly and, on this basis, to initiate a process of reflection on the scientific method and its role in a democratic society. Yet another challenge is how to assess risks that lie in the future.

Furthermore, there is a heated debate going on over whether sustainability is the responsibility of the individual or whether sustainability is rather a political goal. The institutions where educational activities and sustainability communication take place are traditionally sites of mediation between the political and the private (Mieg et al. 2013, 188). Museums can certainly contribute to this mediation, given that they bring the political and private spheres into contact with each other in a much better way than formal educational institutions such as schools or universities. Museums can serve as a mediating institution capable of bridging the apparent contradiction between individual and political responsibility for a sustainable future.

The transformative potential of the public

Göpel (2016) separates instruments and measures for social transformation into different levels, a superficial, medium and deep level. The greatest transformative potential lies at the deep level. Here, changes in the values and mindsets of employees and visitors lead to changes in their visions, goals and collective action (Göpel 2020). According to this view, changing values, a "great mindshift" (Göpel 2020), is the core of any transformation. The emphasis is not on individual behavioural changes, for example through sustainable consumption, but on collective ideas and the general public (see Figure 4.3).

Museums can play an important role in this process, as they can act as significant multipliers (see Chapter 4.1). The authentic experiences encountered during a museum visit, the aura of the object and the emotional stories in the exhibition have the power to stimulate a process of reflection on values and mindsets among visitors. With audience-oriented museum work that focuses these effects, museums can contribute to a collective, public reflection on the underlying mechanisms of unsustainable development. Museum work oriented towards the public in this way draws on sustainability communication methods and benefits from the findings of evaluations in the psychology of communication, but is never manipulative; instead, it pursues an empowering understanding of education and mediation in museums (see Chapter 10.1).

From intention to action: Research on behavioural psychology

Whether and to what extent visitors change their behaviour following a visit to a museum depends on a variety of individual aspects. In addition to attitudes, knowledge and intentions, these also include numerous other factors

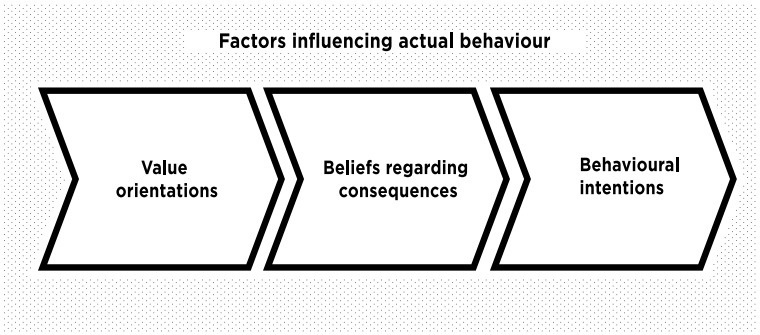

Figure 4.3 Museum communication and sustainable behaviour.
Source: Based on Stern and Dietz 1994, 77.

that are much more difficult to assess. These factors include personal experiences and personality traits such as character, expectations and experiences of self-efficacy as well as perceptions of one's own identity. In addition, there are social and cultural norms that often limit the scope for action. It remains a long-term challenge to relate these psychological issues to museums, exhibitions, educational programmes and their effectiveness. This task is becoming increasingly important in the context of the new role of museums.

If knowledge transfer is one of the major tasks of museums, then the importance of knowledge for environmentally sound or sustainable behaviour is of particular interest. But the correlation between knowledge, attitudes and behaviour is usually weak (Kaiser et al. 1999, 4; Bamberg and Möser 2007; Hines et al. 1987). Environmental knowledge has only a slight influence on attitudes towards relevant issues and on behaviour, which is why people speak of the so-called knowledge-behaviour gap. The low correlation between knowledge and behaviour is explained by different factors, depending on the explanatory psychological model applied (Kaiser et al. 1999, 4).

There are numerous psychological models depicting the connection between knowledge, attitudes, intention and behaviour. The Value-Belief-Norm Theory (Stern et al. 1999), which is applied to individual, social and political actions in relation to environmental problems, seems particularly suitable for use in museums. This model postulates a hierarchy of influence from abstract orientations down to specific forms of behaviour: values influence beliefs, and these influence intentions and thus ultimately also behaviour.

The three elements of value orientations, behavioural beliefs and behavioural intentions are thus at the heart of successful communications. However, the direct influence of values on behaviour is a matter of dispute (Bardi and Schwartz 2003, 1207; Maio et al. 2006, 298). In contrast, intention is a better predictor of behaviour than other cognitive factors such as attitudes, risk perception or personality factors. And yet, only in about half of cases are intentions translated into action (Sheeran and Webb 2016, 516). This is the

so-called intention-behaviour gap (Sheeran 2002, 7). Even if the relevant factors for the transformation of intentions into actual behaviour are still largely unknown (Carrington et al. 2014, 2759), there are some starting points for museum communications. For example, beliefs about the consequences of behaviour are important (Stern et al. 1993, 328); these can also be understood as the perceived costs and benefits of behaviour (Snelgar 2006, 88). Another factor mediating between intentions and actual behaviour is willingness to make personal sacrifices (Carrington et al. 2014, 2764–2765). Sacrificing one's own direct interests in order to promote the well-being of others can also be associated with altruistic moral attitudes and with the fundamental values of sustainability. If this connection is empirically proven, museums could in the future develop strategies that specifically promote such willingness and associated values such as respect, selflessness and caring.

Van Zomeren (2008) points out that it is not individual behavioural changes but collective behaviour that should be the focus of a psychologically informed communication approach. Thus, social group identification could serve as a key explanatory approach to why intentions are translated into behaviour (see van Zomeren et al. 2008). Identifying with a group and its goals, and the associated group-based emotions along with the conviction of being able to make a difference, represent the essential psychological mechanisms here. It is precisely this collective sense of efficacy that could be a significant driver for the Transformation (Fritsche 2015, 30), which is why self-efficacy should be at the centre of sustainability communication in museums.

Applied communication psychology in the museum

Even if messaging customised for specific target groups goes without saying in public-facing museum work, sustainability communication requires a new perspective and a different analysis of the recipients. Not only their attitudes towards the multiple crisis play a role in this, but also their behavioural intentions. With regard to climate change, the public can be divided into the following distinct milieus (Schrader 2021, 100; based on Metag et al. 2017):

- the Alarmed; they are convinced about the negative impacts and they are taking against climate change;
- the Concerned; they share the attitudes of the alarmed to a lesser extent and only take very limited action to protect the climate;
- the Cautious; they are uncertain about the impact on climate change and do not yet have any firm intention to act;
- the Disengaged; they are unsettled but do not concern themselves more deeply with climate change;
- the Doubtful; they are not convinced that climate change is caused by humans;
- the Denialists; they feel curtailed in their individualism and are sceptical about the findings of climate research.

Museums could raise awareness and receptivity especially among the Cautious and the Disengaged. The starting point for successful communication with these target groups is to use simple and clear messaging. Building on this, it is important to make the personal relevance of climate change tangible – focusing on the impacts in the here and now. The involvement of trusted and local experts can add authority and legitimacy to communications (Leiserowitz et al. 2021, 101–102). For the Concerned – and to a lesser extent also the Alarmed – the issue of translating intention into behaviour is particularly relevant. In this respect, communication can address museum visitors more as members of social groups and less as individuals. The focus here is on social identity, self-concepts and social norms. In this way, the perception of self-efficacy in groups as outlined above can be strengthened and used as motivation for collective action.

Based on the findings of a wide range of psychological research, which is only discussed here in brief, and the extensive recommendations made by Schrader (2021), effective sustainability communication in museums should include the following elements in particular:

- using positive messaging and content,
- showing possible solutions and making it possible to experience their effectiveness,
- reducing complexity through consistent argumentation and embedding in narratives,
- handling risks and fear sensitively,
- carefully establishing emotional closeness,
- demonstrating urgency,
- practising routines and behavioural changes,
- using narratives and stories.

A useful guideline for communication that encourages action is the use of positive expressions and perspectives. Overall, negative or demotivating information should be avoided, as this can lead to passivity (Grothmann 2017, 230–235).

In order to face the effects of the crises with positivity, it is important to experience self-efficacy. So an opportunity for practical action, or a proposal for a solution, is a good starting point for communication. Any solutions proposed should be compatible with everyday life and realisable at the local level. Ideally, they should be locally or regionally specific and tailored to the particular situation of the target group. It quickly becomes clear that such communication requires a deep knowledge of the recipients and their life-worlds and a creative ability to anticipate what members of these target groups want and are able to do.

The complexity of the issues often leads to confusing, potentially contradictory messages. Care should always be taken to ensure that information and messages do not contradict each other; rather, they should mutually reinforce each other. However, this requires a selection of arguments in advance

and a focus on those aspects with which a consistent pattern of argumentation can be developed. Embedding these arguments in narratives or lines of discourse is important for making communication relatable, because they provide a pattern for interpreting information and at the same time arouse associations and generate emotions. It is important in this context to develop an awareness of the prevailing narratives and framings within the climate change and sustainability discourse in order to position one's own communications within them and to better attune their impact to the target group. In addition to the content of the communication, the mode of communication is also key, especially with complex topics. It should be exciting and varied and attract attention. At the same time, comparisons and analogies can be used to stimulate the imagination (Moser 2010, 40). Integrating art into communication is a very good way to reduce complexity. Unlike rational scientific explanations, art facilitates an indirect understanding of the underlying complexity (John 2015, 84).

There are many risks linked to the global crises. The aim of risk communication is to focus on the risks themselves, and not on hazards or damage. Furthermore, the risks linked to global change should be reported in a way that encourages recipients to act (Adomßent and Godemann 2011, 31–32). In addition to dangers and risks, the fears generated especially by climate change communication also play a role. Such fears cause defensive reactions such as denial or wishful thinking and fatalism, which further reduce the willingness to act (van Zomeren et al. 2010, 344). Because communicating risks often triggers fear and sets off defence mechanisms, the focus should be on the different possible solutions, and the overall aim should be to foster hope (Schrader 2021). One way of doing this is through introducing and telling stories about pioneers and role models who can be linked to the visitors' lifeworlds.

Emotions can be seen as a motivating element that should be considered in a nuanced way in the conception and planning of communications. It is important to note that taking emotions and emotional closeness into account is not the same as deliberately arousing emotions. Arousing emotions should be viewed with ambivalence at best, not least because emotional reactions are often very specific to the individual and it cannot be assumed that the intended effects and behavioural intentions will be obtained (Chapman et al. 2017). On the other hand, the creation of emotional closeness can be a powerful approach to communication, albeit one that is highly contingent on external factors. The starting point is to identify what is of emotional significance for the respective target group. For communication to be effective in terms of intentions and behaviour, it is particularly relevant to get a sense of what touches the target group in their personal everyday life and motivates them to act. Focus groups can be a useful tool for this. Visualisation and putting oneself in other people's shoes (e.g. grandchildren or people in other parts of the world) can be good starting points for communicating values such as empathy, respect and responsibility. Emotional closeness can also provoke defensive reactions, denial or fear. It is very important not to end by

leaving behind a feeling of powerlessness, but to focus on possible solutions in general and on individual options for practical action through positive communication (Schrader 2021, 173).

For problems with long-time horizons, an approach based on temporal proximity should be adopted. If problems or their effects lie far in the future, an attempt can be made to find effects or options for action situated in the near future and to focus communication on this (Schrader 2021, 81).

When communication aims to alter behaviour, routines and habits are a key to change. Different approaches can be used to encourage changes in habitual behaviour. These include practising micro-habits, using triggers and rewarding small successes. The gap between intention and behaviour can also be addressed in communications. Another related approach is to focus on specific situations in which intention is translated into action – often decision-making situations where different options are available. These can be visualised in exhibitions, for example, and thus decision-making can be tested and the intended behaviour practised. As a further factor in behaviour, convictions concerning the consequences of a given behaviour should be addressed. Communication in museums and exhibitions could reflect far more than it has done up to now the cost-benefit analysis of individual behaviours.

Storytelling can be another very good way to communicate about sustainability in a relaxed and effective way. Stories often present few barriers because they work with images, focus on people and their experiences, and are entertaining and exciting and thus hold the listener's attention. Moreover, they have qualities that are central to the goals of sustainability communication and education for sustainable development (see Chapter 10). By putting themselves in the shoes of the main characters, listeners can adopt different perspectives, practise empathy and open themselves up to new ways of seeing things. Through stories, shared meanings, shared ideas and shared realities are constructed. They are especially helpful wherever obstacles of a practical and everyday nature make it difficult for people to act sustainably (Schrader 2021, 231).

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Part II

Sustainable museum management

5 Transformational leadership and museum governance

Sustainability as a guiding principle calls for radical change in museums. Such a reorientation includes both strategic decision-making and aspects of working culture. What is the role of management here? What impact do management style and human resources policy have? In what follows, the top-down impetus required for change is integrated into the social relations in the museum and on site by means of a governance approach.

	Vision
Identity	Transformational leadership for museums at the centre of society
Expertise	Strong moral orientation, logic model, cooperation competence, futures literacy
Practice	A focus on achieving and enhancing social impact

5.1 Strategic development through impact orientation

The impacts that museums have are manifold, and numerous analyses and empirical studies have been published on their positive social effects (z.B. Scott 2006, 59–65). Apart from their endeavours in the field of sustainability, museums primarily contribute to community identity, social cohesion, democracy building and civil society dialogue; they support an enlightened society, new knowledge, the negotiation of key challenges of the present and the future, happiness and well-being, and they promote community capacity building and urban development (siehe Thompson et al. 2011). Their impacts in these fields can be assessed in terms of their importance for sustainable development and can be targeted and strengthened accordingly. One link between sustainability and these wider functions is through their contribution to a democratic and open society. Museums can contribute to this in many ways and can be "an important bulwark against the erosion of the public realm" (Thompson et al. 2011, 6).

Often, however, there is only a very loose connection between the mission of a museum and its actual activities and their impacts. This phenomenon can be termed decoupling. Impact-oriented management and impact measurement

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can address this problem and contribute to the achievement of a museum's tasks and missions (siehe Arvidson and Lyon 2014, 882).[1]

Especially in the non-profit sector, an impact-oriented view of the activities of organisations or institutions is becoming increasingly important. One reason for this is the pressure to communicate the impact of the work and to use it in representing the organisation to the outside world. However, this focus excludes the greatest potential that impact orientation offers. This potential lies in the continuous learning process it triggers. An ongoing review and optimisation of a museum's impact enable it to become a learning organisation. As museums per se aim to contribute to the common good, they are in a perfect position to lead the way when it comes to planning, measuring and reporting an understanding of sustainability that is focused on impact (see Jones and Mucha 2014, 1479).

Measuring the impact of a museum

Impact orientation and social impact assessment are approaches that have many overlaps with corporate social responsibility and similar frameworks. Although these overlaps have rarely been systematically explored and mapped (Nigri and Michelini 2019, 65), the various concepts are useful in providing different entry points for the transformation of museum operations.

Measuring impacts is challenging because it requires competence in the implementation of social science research, long time series and considerable human resources (siehe Ebrahim and Rangan 2014, 132).[2] This often exceeds the capacities of museums. Notwithstanding this, museums should seize the opportunity to engage with impact measurement and to integrate the underlying thinking and approaches into their work as a matter of course.

Creating a "logic model" serves as a starting point. This describes the logical relationships between resources, services and impacts at the level of the target group as well as at the level of society as a whole. The design and development of a logic model enables the measurement and monitoring of impacts and also facilitates the identification of the most important areas to be measured (Knowlton and Phillips 2013, 89–95). Logic models for museums identify the key outcomes expected of museum work and link these to resources and measures (Ebrahim and Rangan 2014, 137). Such a logic model is developed together with all stakeholders. This means that the model and thus the basis for the impact orientation already contain, at least implicitly, a shared vision as well as a shared definition of successful action (McLaughlin and Jordan 2015, 86).

A logic model consists of the following levels:

- Input,
- Output,
- Outcome,
- Impact.

Input refers to the resources deployed to achieve the objectives. This should be taken into account in order to make the importance of resource allocation within the museum transparent and to improve the efficiency of the measures. Indicators can be used to represent the input as well as the other levels of the logic model. Output describes the measures or the activities carried out within the framework of sustainability management. This includes, for example, the processes of sustainability management such as participation opportunities as well as the specific activities within the sustainability programme in the various fields of action. Output can be, for example, the number of events held or the number of participants. Whether all the stakeholders addressed were actually reached also plays a role. Outcome is the impact of a museum's activities on its immediate target group. This includes the public and the users of a museum's scientific facilities. Within the target groups, a distinction can be made between different levels of impact, ranging from knowledge to attitudes to behaviour. The impact is differentiated according to whether and to what extent, as a result of sustainability management, knowledge – on the first level – changes in the target groups; attitudes, on the second level; and behaviour, on the third level. Outcome thus also directly addresses the dimensions of "function and experience" within the consultation process for a new museum definition being undertaken by ICOM (The International Council of Museums 2021). In this context, such a logic model also points to possible ways of fine-tuning the definition of museums.

Planning for impact of museum work at the societal level lies at the heart of an impact-oriented approach. Impact shows which society-wide trends are supported by sustainability management, which stakeholders, actors and groups benefit from the work in museums, and how the effects on local circumstances should be evaluated. The challenge here is to relate broad societal issues to museum work and to operationalise the impact accordingly. Since changes in society as a whole are influenced by many developments and framework conditions, the contribution of museum work cannot usually be identified in isolation. It is also helpful for the development of that work to address only specific sub-issues, localised impacts or sub-groups rather than a problem for society as a whole or a very wide-ranging issue. For this reason, it makes sense to check on a case-by-case basis whether a quantitative target value is appropriate. It must be taken into account that processes affecting society as a whole often have a long-time horizon.

While there are many other instruments for measuring impact besides logic models, less elaborate approaches are particularly interesting for museums. These include, for example, story-based evaluation focusing on the most important changes. This type of impact measurement identifies changes and impacts without the use of indicators. The measurement is carried out using stories about change at a practical level. Subsequently, the most important of these stories are systematically selected by a specially appointed panel (Ebrahim and Rangan 2014, 137–138). In the context of an evaluation process, a story is something involving a planned approach, not a random narrative. The source of each story is identified and the story is verified by other

people. An evaluation story is complemented by documentation that describes how the story was recorded using a specific methodology. It should also include an assessment of the extent to which the story can be considered representative for other people in the target group (Krueger 2015, 538).

5.2 Governance, leadership and new work

Participation and involvement are fundamental concepts for the implementation of sustainable development. In order to pursue a comprehensive participatory approach in museums, it will be important to involve different stakeholders to an even greater extent than in the past. Stakeholders in a museum are all individuals, groups and organisations that are involved in, interested in or affected by the work of the museum. Museum stakeholders include

- civil society in a broad sense,
- the public,
- the staff,
- the governing board and other advisory bodies,
- funders, such as public authorities, foundations, donors, sponsors and investors,
- artists and collectors,
- scientists, researchers and students,
- suppliers and service providers,
- local actors such as the local administration, local government and companies,
- cooperation partners, understood as broadly as possible,
- politicians and non-governmental organisations,
- the museum and cultural sector in general.

For the aim of the sustainable museum, it is important to analyse the requirements and expectations of stakeholders and to integrate them more strongly into the museum's work, and thus to develop more new forms of governance for museum work.

Museum governance for sustainability

The concept of corporate governance relates to the effective management of companies and addresses, among other things, transparent and fair markets, efficient allocation of resources and, in particular, the recognition of stakeholders' rights and the promotion of active cooperation, disclosure and transparency (Organisation for Economic Co-operation and Development 2015, 9–11).

While the corporate governance approach was originally primarily concerned with protecting the interests of stakeholders, good governance is understood here as the sustainable management of museums. This means that the interests of the stakeholders are supplemented here by the principles of corporate social responsibility (Fischer 2017, 206).[3] Good governance in

the sustainable museum means transparency with respect to internal decision-making processes and disclosure of the museum's working methods. Opening up the museum at this fundamental level leads to a positive social and programmatic outcome. Such fundamental considerations, which at their core are ethically motivated, are thereby paired with administration that focuses on efficiency and effectiveness in operations. This also reduces rigid internal structures and helps them to become more agile. Governance in the museum sector also serves to define and cement the new, more sustainable role of museums in society. Stakeholder relations within governance processes lead to a new interpretation of what museums do in and for society and the Transformation process. Governance can therefore also be seen as the core of cultural change, making possible a perceptible and communicable change in the evaluation of museum services (see O'Riordan 2017, 425). As a result of the opening up, key stakeholders also have a greater impact on the museum landscape: for example, museums are increasingly devoting themselves to different aspects of sustainability, not least because of pressure from their most important stakeholders, and are thus merging principles of good governance with those of corporate responsibility. Conversely, museums are increasingly influencing how non-public bodies are governed. This political role also relates to global problems, especially with regard to aspects of sustainability, which means that museums are also likely to become more important for global governance (Fischer 2017, 275–277).

Governance in the museum sector remains for the most part traditional and static, with limited public participation, especially in decision-making processes (Bandelli et al. 2009, 99–100). Research on the impact of different forms of governance has shown that the configuration of these stakeholder relationships has relevance for museums. For example, different forms of governance, especially with respect to private donors and for private museums, have an impact on visitor numbers, public branding and finances – the precise extent depends very much on the local context (Goetzmann and Oster 2003, 97). These participation processes are very demanding, because internal obstacles within the museum – such as the struggle for authority over decision-making and interpretation, as well as the generally unclear role of the public in such participation processes – often prevent their successful implementation (Bandelli and Konijn 2013, 433–434). Stakeholders' expectations should be treated with respect, and consideration of their interests should be embedded in the museum's decision-making processes at the senior management level. Good governance practice for museums defines the procedural operation of the museum's decision-making bodies, the responsibilities of senior managers towards individual stakeholders and the requirements for transparency and communication to stakeholders (see Aluchna 2017, 99).

With regard to individual stakeholders and bodies, funders – often public bodies such as local, regional or national government – represent one group that is of particular importance in the museum sector. The challenge is not to minimise the influence of the funders or, in the case of a public administration, to minimise the intrusion of the bureaucracy into the running of the museum.

Rather, it is a matter of actively and openly managing these relationships in order to negotiate the claims of both stakeholder groups to influence on the museum operation. In order to meet these challenges, it is necessary to develop a shared understanding of what is intended to be achieved and a common definition of goals. Impact-oriented monitoring and reporting involves both stakeholder groups in a practical and goal-oriented dialogue with the museum (Griffin 1991, 294). Sustainability management provides an ideal tool for this.

The other group that is of significant importance is the governing board, which usually supports and supervises how museums fulfil their mission. One of the important tasks of the board is that of reviewing the museum's performance. Other roles include supervising the management and ensuring that legal requirements are met. Such an understanding of governance contributes to greater responsibility and transparency in order to meet the more complex requirements and framework conditions relating to sustainability (Rentschler 2004, 36). The board therefore has a special role to play with respect to good governance. Diversity in the composition of the board – in terms of gender, age, social background and education – has a positive effect on the commitment to sustainability. Furthermore, the activities of individual board members can significantly strengthen the focus on sustainability in the museum. However, it should be noted that under some circumstances one board member's priorities can also influence the entire sustainability management or reporting in an undesirable way (see Minciullo 2019, 30–31).

Good governance involves transparency and accountability. This means that detailed information must be provided on the role and scope for influence of the various function holders, such as the executive management, the governing bodies and advisory boards (Camilleri 2017, 12). One important difference between Corporate Governance and the governance of museums is that in the museum sector, while management is often accountable to a board, these boards are rarely accountable to any other body outside the museum (see Glaeser 2003, 1).[4] The weak formalisation of forms of governance in the museum sector has also led to a development that can be described as encapsulation or self-referentiality. The governance of museums is shaped less by stakeholders and more by specialists such as curators. This development can also be observed in other organisations in the non-profit sector. It is particularly important when it comes to improving sustainability performance that these weak governance structures should be dismantled and strengthened. This also contributes to a stronger orientation of museums towards the outside (see Glaeser 2003, 40).

Both the way negotiation is conducted within the governance process and the stakeholders who are taken into account differ considerably around the globe (Banik 2015b, 3–4) – especially in the case of national museums. This is because the direct influence of the public sector in museums is a direct consequence of the basic structure of public administration in the respective country (Griffin 1991, 295). In the Global South, too, stakeholder activism is increasingly leading to calls for museums to improve their governance. In particular, sustainability action on account of the pressing problems is leading to

greater stakeholder involvement and better governance arrangements (Banik 2015a, 159). Governance is particularly important for the relationship with indigenous communities. The most important aspect is the active management and maintenance of long-term relationships. This means that it is important not only to initiate one-off activities or pilot projects, but also to develop a strategy for long-term and constructive cooperation. It is advantageous for both sides to cement and formalise the cooperation by means of written documents. Especially for museums that engage with indigenous culture and history, having indigenous representatives on the governing board should be a matter of course (Scott and Luby 2007, 280–282). Local communities also play a key role as stakeholders, including in small and medium-sized museums. Forms of governance should therefore be developed in such museums that focus on local and regional cooperation, where – in contrast to large national institutions – public administration bodies and large boards have a stronger claim to a share of power (Nelson 2020, 46).

Leadership style and hierarchies

As museums are complex and unique organisations, good leadership in the museum environment is also characterised by specific demands and approaches. Against the backdrop of societal transformation towards sustainability in general and the changes in museums in particular, the question arises as to which approaches to leadership and management are suitable for supporting the process of change. The transformational leadership approach can be understood as a change-oriented leadership that is particularly effective in crises and transitional situations, and therefore seems very suitable (Pundt and Nerdinger 2012, 27). Transformational leadership offers in particular the opportunity for senior managers to intensify and improve their relationship with employees at all levels (Muralidharan and Pathak 2018, 580). Ideally, transformational leadership will be combined with transactional leadership approaches. Whereas transactional leadership methods help to develop a structural orientation that frames the behaviour of employees, transformational leadership methods can be used to convey sustainability-oriented goals, visions and values (Stock-Homburg et al. 2014, 309). In addition, the concept of shared leadership may also be suitable for implementing change – including in the management culture. Within the framework of shared leadership, processes of change are also promoted through cooperation within the team (Pundt and Nerdinger 2012, 42).

The concept of sustainable leadership is more narrowly focused on content. According to Gerard (2017, 8–12) sustainable leadership is characterised by three principles. Firstly, ethical obligations with regard to the outside world are taken as the foundation for one's own actions. Secondly, the consideration of stakeholder interests and their integration into the long-term strategy of museums serves as a fulcrum. Thirdly, the optimisation of internal processes and the development of internal capacities is established as a working practice. This is implemented through a focus on learning and development for the

whole organisation as well as staff at all levels of the museum. Sustainable leadership requires management to situate its leadership style within the complex dynamics of global crises in order to build their relationships and to co-create pragmatic responses to challenges through collaborative approaches (Ferdig 2007, 33). At the core of this leadership style is thus a "sustainability-literate world view" (Parkin 2010, 155).

The changes in museums require not only a management style in which shared competence and responsibility predominate, but also the dismantling of steep hierarchies (Janes and Sandell 2019, 9). The often rigid, hierarchical structure of museums could become more permeable and flatter in the future. Decentralised decision-making powers allow employees to take more responsibility for their own work. This also results in clear communication of the expected outcomes for which each staff member is responsible (see Figure 5.1). The dismantling of hierarchies also affects the functional organisation of museums. Whenever possible, communication and decision-making across disciplinary boundaries should be simplified and supported. Museums

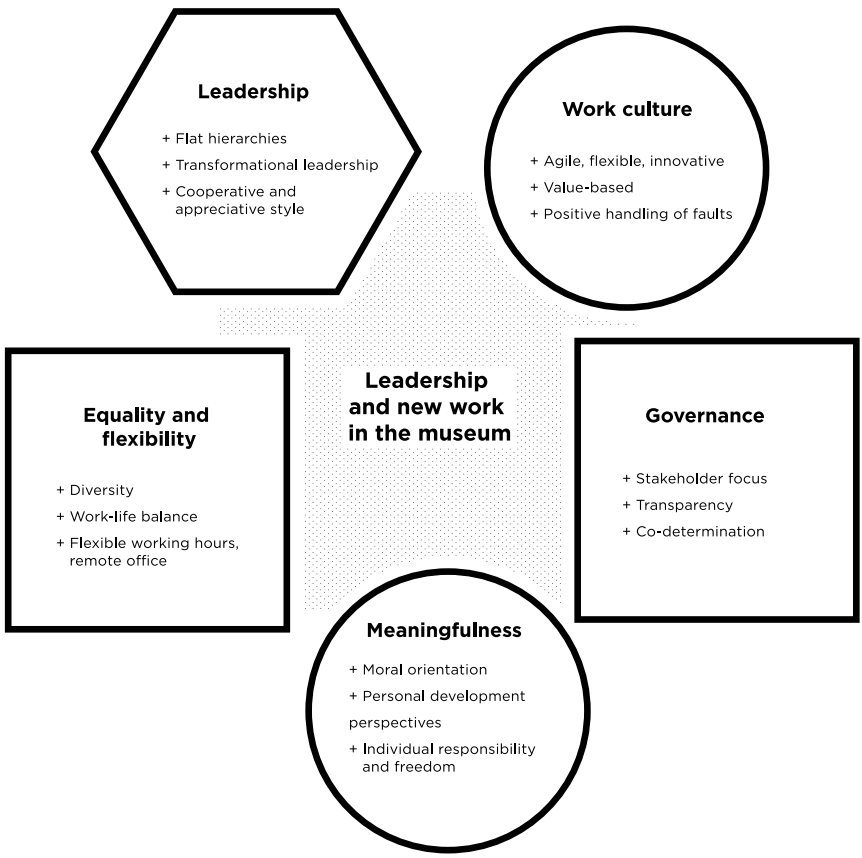

Figure 5.1 Leadership and New Work in the sustainable museum.

should implement targets and motivate staff to bring in new ideas and innovations. In such a management style, employees are also called upon to bring their personal, non-professional skills, knowledge and experience to bear. Such impulses can be important in motivating staff and realising the full potential of the museum for collaboration with diverse stakeholders. In this way, previously unknown employee skills and networks within local communities can be made visible and utilised (Black 2021, 261–262).

New Work and workplace culture

These changes of management style and organisational structure contribute to a new workplace culture in museums. Approaches and tools from the concept of New Work can provide valuable inspiration for supporting the desired change in workplace culture towards sustainability. New Work tools often aim to make work more meaningful, increase employee satisfaction and facilitate better work outcomes (Schnell and Schnell 2019, 17). Another aspect of New Work is that the participation of employees is understood as a core element of the management of the museum as an institution (see Hackl et al. 2017, 94).[5] Such a change in organisational culture, encompassing flat hierarchies, open collaboration, a non-competitive atmosphere and honest communications within the institution, leads to closer interaction with local communities and attracts volunteers, new staff and visitors (Lyth et al. 2017, 12). A participatory working culture can be seen as a prerequisite for having a galvanising and attracting impact outside the organisation. One tool available to museum managers is the use of mission statements. These can be used to set the strategic direction of the museum, which can then be clearly communicated internally and externally. Directors can also significantly increase the effectiveness of their leadership by strategically developing and deploying mission statements (Davies 2007, 270). Mission statements can also be formulated for the individual areas of responsibility within the museum; the information boxes in the relevant chapters provide starting points for this exercise.

Toolbox

Method | moderating change

Dynamic facilitation is a suitable moderation method. This takes the form of an open, moderated group discussion focusing on finding creative solutions. To begin with, all statements made by the participants are collected under the headings of challenges and questions, solutions and ideas, reservations and objections, and information and viewpoints. The open space that is created by this comprehensive stocktaking releases the creative potential of the participants and enables the emergence of new ideas and solutions (Rough 1997, 35–36).

5.3 Human resources policy and the workplace

One aspect of a social sustainability is the responsible treatment of employees. The sustainable museum as a workplace thus focuses on the working situation of employees and their opportunities for access and development.

The museum as employer

The sustainable museum as a workplace is a safe, inclusive and open site that delivers equality for all employees – from recruitment to day-to-day work to promotion opportunities – and does not tolerate discrimination, and furthermore breaks down systemic disadvantage. Diversity is a foundation for human resources policy in the sustainable museum.

This equality of rights applies, among other things, to people who are socially disadvantaged due to physical characteristics, their membership of ethnic groups, the colour of their skin or their sexual orientation. Systematic discrimination against women, in museums, too, comes in many forms (Baldwin and Ackerson 2017). Although women make up a high proportion of staff in museums, they are still underrepresented in senior positions and as directors. However, the large number of well-qualified female employees with long service records is an ideal prerequisite for museums to take on a pioneering role in the public sector in achieving equal rights for women. This also includes the basic principle of equal pay, which means that equal pay is paid for different, but equivalent, work. This has a particular relevance to the wage gap that persists between men and women in many countries and institutions. In addition, the museum sector is characterised by high numbers of fixed-term contracts and part-time jobs, which contribute to precarity among the staff. Inclusion as a basic principle of human resources policy also means that employees are empowered and supported to practise inclusion in their daily work. A diverse workforce contributes to an inclusive way of working and helps create agile and learning organisations (Taylor 2017, 155).

For companies, sustainability means offering a safe and healthy workplace. Making the workplace fit for employees with different support needs should be a matter of course. Creating a productive, ecologically optimised workplace can support the internal process of transformation and contribute significantly to its implementation.

Productive work environments are characterised, among other things, by the following structural features: room to move, changes and variability in layout, scope for personalisation including personalisation of one's surroundings, good indoor air quality, plants and an outside view. Factors that inhibit work productivity include noise and visual distractions, reflective displays and interruptions in general (Stringer 2009, 168). Promoting good health is an aspect of sustainability that can be addressed through the organisation of working hours and office infrastructure. Employees' mobility also plays a role in the museum's sustainability performance. The use of private transport for commuting can be reduced by subsidies for public transport

passes. For business trips, the need for air travel should be reviewed and, if necessary, only permitted above a set distance.

Sustainable human resources policy

If the sustainable museum is brought into being by the people in the museum and their social interactions, then human resources policy and staff development do indeed have a crucial role to play in the process of change.

Sustainable human resources policy structures employment relationships while taking into account both business and societal goals relating to ecological, social and economic sustainability. A sustainable human resources policy approach is one that integrates options for the management of employment relationships with a contribution to sustainable corporate development (Ehnert et al. 2014, 19). Sustainable human resources policy aims to empower employees to act sustainably, to motivate them to do so themselves, and to provide opportunities for sustainable activities. Specific measures include, for example, recruitment strategies that integrate sustainability aspects into job descriptions. It also includes knowledge management for sustainability and using goals, targets and responsibilities to assess sustainability outcomes. Remuneration and reward systems can also be used for this purpose. For example, criteria for more sustainable processes can be integrated into workplace suggestion schemes. Incentive structures for human resource development can also be geared towards qualifications and competence in sustainability – for example, relevant skills can be taken into account in performance assessments (Kirschten 2008, 263). In general, a sustainable human resources policy should also improve opportunities for employee participation and promote employee empowerment and involvement (Renwick et al. 2013, 9).

Criteria for the adoption of a sustainable human resources policy include the Indexes on the Quality of Working Life and on Workplace Quality. The quality of working life focuses on job satisfaction and motivation at the level of the individual. The job quality index includes indicators such as wages, non-standard forms of employment, working hours and work-life balance, working conditions and workplace safety, career development opportunities and employee representation (Zink 2014, 40–41). Sustainable human resources policy is particularly effective when it promotes the ability of employees to deal with conflict and complexity, when it also strengthens personal moral values through further training and when it encourages participatory processes through workplace design and the organisational framework; this includes supporting employee participation in civil society organisations outside the museum as well (Voegtlin and Greenwood 2016, 197–198). The adoption of a sustainable human resources policy has a wide range of impacts on a museum. These include a positive impact on environmental, social and economic performance, the promotion of a healthy and motivated workforce in general, and the recruitment and further development of skilled workers in particular. Sustainable human resources policies enhance the psychological and social well-being of employees and increase job satisfaction and commitment (Macke and Genari 2019, 810–813).

Good practice

The sustainable museum: Who cares?

Manchester Museum, United Kingdom

Manchester Museum, at the University of Manchester, is driven by a clear mission – to build understanding between cultures and build a more sustainable world. It is one of the U.K.'s largest university museums, is a critical part of the research infrastructure and has a crucial civic role encouraging care, cooperation and building capacity for local ecological action. It is the world's first Carbon Literate Museum and in a unique partnership with the Carbon Literacy Project, develops and runs programmes, training and supports cultural leaders and U.K.'s museum sector to be more carbon literate. This is foundational work supporting staff, volunteers and partners to build understanding and awareness and take positive, informed action and decisions.

Building a culture and ethics of care across the museum has been essential to this approach and its development. This extends beyond collections to people, ideas, places, beliefs and relationships. The whole museum worked together to explore the values that drive us. Deep ecology and commitment to care emerged as foundational and shared values and alongside a commitment to imagination and inclusion. Building a culture of care is incremental. Over the past three years, the staff well-being programme has included dedicated time away from the museum – volunteering outdoors, cooking, eating, canoeing, walking and talking and, ultimately, learning to love the natural world more deeply and forming genuine relationships with each other.

Workspaces are increasingly shared and social spaces. The top floor is a new co-working hub for ecological action and social justice; bringing together environmental organisations and activists, educational charities and community groups to work alongside the Civic Education and Engagement team. The museum is rethinking education for future survival.

Opening up the museum and the commitment to care are shaping work beyond the museum walls. Manchester Museum is asking people what matters most to them and using this as a catalyst for action and empathy; for example, working with students to support conversations about climate grief and supporting older people in housing associations who want to share their experience of sustainable practices and eco activism with younger generations. If building a more sustainable world is taken seriously, urgently fostering a culture that values how humans care and build empathy and understanding for the planet and each other, this has to be a collective endeavour.

Contributed by
Esme Ward

Human resources development

The aim of sustainable human resource development is to enable employees to integrate value-based goals related to sustainable transformation into their daily work alongside their technical expertise in such a way that they also benefit themselves in terms of their career development. Human resource development in the context of sustainability is characterised by a clear orientation towards the needs of employees as an internal stakeholder group (Kurz et al. 2018, 228).

One element of sustainable human resource development is to make possible the acquisition of relevant qualifications and skills through training and further education programmes. This involves not only technical expertise, but also the ability to apply this knowledge to work processes and routines (Kirschten 2008, 262). Sustainability can be integrated into staff and organisational development in museums in different ways. These include (Schmitt 2018, 71–72):

- raising awareness and imparting knowledge: sustainability and sustainability issues as an explicit focus of human resource development measures;
- personal development: promoting values and skills related to sustainability.

Further education and training courses in museums can address sustainability-oriented action in the following contexts (Schmitt 2018, 74):

- behaviour in the workplace (site-specific),
- activity (content-related),
- personality (individual behavioural aspects),
- structure (social and institutional framework).

Formats oriented towards education for sustainable development are particularly suitable for the integration of these requirements into qualification and further education schemes (Kurz et al. 2017, 37).

Toolbox

Sustainable Practice | Leadership and governance

1 Practising a leadership style based on fairness, appreciation and kindness.
2 Initiating an ongoing stakeholder dialogue.
3 Ensuring equal opportunities and fair pay for all employees.
4 Creating a logic model for the museum.
5 Offering further education and training with a sustainability focus.

Notes

1 Based, like Jones and Mucha in what follows, on non-profit organisations.
2 This draws on management recommendations for social impact analysis.
3 Based, like Fischer, Aluchna and Minciullo in what follows, on publications on CSR management.
4 Drawing on governance research in the non-profit sector.
5 Based on general New Work approaches.

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6 Sustainable management and eco-efficient museum operations

The management and operations functions are the key switch points via which the museum's sustainability performance can be improved. Facility management and the associated resource management tasks represent a broad range of relevant responsibilities. Which levers can be used to optimise the internal sustainability of museum operations? Considerable improvements in terms of ecological impact and financial savings can be achieved in facility management in particular. A sustainable procurement policy can also have a leverage effect on the market and thus on society as a whole.

	Vision
Identity	Prototype of a sustainable institution and progressive employer
Expertise	Agility, innovative process design, diversity, efficiency and sufficiency
Practice	Enabling all staff and departments to work more sustainably

6.1 Institutional resilience and a broader approach to accounting

The economic dimension of sustainability is demonstrated in the overall improvement of financial resilience. In addition, sustainable activities in other operational areas also contribute to making financial savings. Furthermore, sustainability accounting as an internal driver can promote the overall evolution towards a sustainable museum.

Financial resilience

Resilient organisations are able to withstand disruptions and fulfil their core function to a large degree regardless of adverse external circumstances. The degree of stability and flexibility of a museum plays a decisive role in this (see DesJardine et al. 2019, 1436).[1] Organisational resilience can support museums in continuing to operate despite external disruptions and at the same time developing the capacity to regenerate. Social and ecological measures also

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contribute to the overall resilience of an institution (DesJardine et al. 2019, 1455). The Covid pandemic and the global financial crisis especially have shown that it is essential for the resilience of museums that the cyclical upturns and downturns in the economy are taken into account and planned for (see Kotler et al. 2008, 189). A higher level of resilience requires above all an increase in the number of income sources, and thus possibly a reduction in dependency on public grants and subsidies, as well as a reduction in costs.

The economic management of museums is substantially influenced by the wide range of tasks they perform as well as by their different sources of funding, which often follow non-profit-oriented models. In addition, high fixed costs are typical, although they are only partially dependent on visitor numbers. Overall, there is only limited potential for savings that could be used to finance other activities or investments (Lindqvist 2012, 15). The main types of income include core funding, donations, sponsorship and earned income (Lindqvist 2012, 3).

To secure and expand income sources, a strategy for greater economic resilience and sustainability focuses on three approaches:

1. increasing the revenues generated by the museum,
2. diversifying the funding structure through professional marketing and a funding network,
3. political lobbying to secure core funding for the long term.

The revenues generated by museums include above all admission fees, but also income from guided tours, courses and events, income from renting out rooms, income from shops and catering and from membership fees, e-commerce, licensing agreements and royalties. Professionalised marketing in particular can help to increase income generation and diversify sources of revenue (Lindqvist 2012, 3). Parts of the museum sector are characterised by a not unfounded aversion to privatisation and commercialisation, which means that a strategic development of revenue sources is often seen as undesirable commercialisation (Kotler et al. 2008, 198).

Admission prices and museum shops

It belongs to the sense of identity of museums that they operate to a certain extent outside of economic maxims such as profit maximisation. If equal rights and free access to information are cornerstones of a participatory science society and of sustainable development in general, then this also implies the need for a discussion about admission fees for museums. In many parts of the world, admission fees are charged as a matter of course, and a discussion about universal free admission to all museums often meets with resistance and incomprehension there. A meta-analysis of different countries by Kliment (2019) shows that, with free admission, visitor numbers increase significantly in some cases, but that as a rule a diversification of the audience

structure is not achieved. In addition, the lower income from admission fees is not compensated by additional income from catering or shops. Nevertheless, free admission and higher visitor numbers strengthen museums' ties to the local community and make them more relevant (Kliment 2019, 23–25). To achieve an increase in the number of visitors from socially disadvantaged or educationally deprived target groups, free admission does not seem to be a sufficient measure. In the interest of greater equality in the context of sustainability, at least some days with free admission can be introduced, while at the same time ticket charges for regular visitors can be used to generate revenue (O'Hagan 1995, 45). Additional initiatives are needed here to promote audience diversity.

In the United States, contributions from supporting members are also a significant source of revenue. Such an approach could be extended to the museum sector as a whole, in a similar way to the digital business model of selling services via subscription. Different categories of membership could include different premium additional services for interested parties and visitors that go beyond the general services provided to the community by the museum. Many museums could develop a new and permanent source of income by developing such membership models for specific target groups, with customised benefit packages.

Besides admission fees, museum shops also have an important role to play. Museum shops have evolved from a meaningless sideline to an important functional part of the museum, for which Mottner (2005; 2007) has developed numerous proposals, presented below. Ideally, museum visitors can use the products on offer to continue their visit at home and thus prolong the visitor experience. If the products are developed strategically, they can also support important museum tasks such as outreach and education. The growing importance of museum shops has often led to significant increases in income. Museum shops and their products and impact are particularly successful when product development is embedded in the museum's overall strategic planning, or at least in its overarching marketing strategy (Mottner and Ford 2005, 838).

In addition to shop managers and in some cases suppliers, curators and museum educators can also be involved in this kind of product development. Building on the collection or exhibition, unique products can then be developed that are not only genuinely related to the museum's mission and to the source of the acquisition, but that also establish a unique selling proposition for the product range. The products developed in this way can be related to items in the collection and can enhance awareness of significant objects in order to integrate them into the everyday life of visitors as multipliers and ambassadors for the museum (Mottner and Ford 2005, 837). In addition to reproductions, this can mean adaptations, further interpretations or the purchase of other related products (Mottner 2007, 143–144). In particular, seemingly banal products based on familiar objects in the collection, such as mobile phone cases, can have a far-reaching positive

effect, as they are integrated into visitors' everyday lives as objects of general daily use (Albuquerque and Delgado 2015, 6418). In this way, the subject or mission of the museum can be represented at least visually, even if not in intellectual depth, and a broad target group can be reached. Extending the visitor experience through purchasable products means triggering and keeping alive memories of the visit. In addition to product development in general, this is also related to the design of the shop and the presentation of the products in it. The product and its context thus remind the visitor of the experience at the exhibition and make it easier to maintain an emotional connection, thereby strengthening the bond with the museum. An important factor for the success of museum shops are trained staff as well as managers who are salespeople on the one hand, but who also have a deep knowledge of the collection, the museum and its specific products – and who can also answer questions about their sustainable production (Mottner 2007, 147).

Diversification of funding

With respect to institutional resilience, one problem is that museums in many countries are heavily dependent on a single source of income – state funding. This puts them in a high-risk economic situation. When state budgets shrink, this can quickly become life-threatening for museums. Loosening this dependency supports financial resilience.

In countries where museums have long relied on non-public funding, the level of professionalisation in fundraising, marketing and financial management is often higher than in countries where museums are predominantly funded from public money. It is worthwhile in this context to transfer the numerous tools and insights from the United States and other similar countries to the local situation in order to ensure more diversified and robust funding (Woodward 2012, 25).

In order to secure long-term funding, the importance of the different stakeholders and their influence on the museum's finances must also be analysed and correspondingly addressed. For example, certain foundations at the national level can become so important for museums that the board that decides on the allocation of the foundation's funds is a key stakeholder for the entire national museum sector (Lindqvist 2012, 8–9). In order to correlate funding from different sources, the interdependencies between these sources must also be taken into account. For example, Hughes and Luksetich (1999), points out that there is often a positive correlation between public and private funding, which can constitute a barrier preventing small and underfunded museums from finding new sources of funding. Further distinctions must also be drawn within public funding. For example, public funding at the local level often steps in when national or other subnational funding is not available. In addition, museum income, individual donations and sponsorship, as well as local or regional funding from public donors, can often be dependent

on the museum's location and the socio-economic situation in the catchment area for visitors (Hughes and Luksetich 1999, 27–28). Systems theory and related approaches can provide new ideas for the funding of museums. For example, game theory can be used to analyse whether the network of funding sources is characterised by numerous equally strong nodes or dominated by a few powerful nodes. This can lead to direct recommendations for the development of a strong financial network and for museum fundraising strategies (see dazu Mann 2017, 177).

However, diversification strategies bring their own risks. State museums in particular find themselves in a dilemma here, as saving costs or gaining additional funding or sponsors usually entails a reduction in public funding. Moreover, a reduction in basic public funding often also leads to a further reduction in project funding or sponsorship, as a maximum funding ratio often applies here and own contributions have to be made (Hughes and Luksetich 1999, 36). Museums that depend on donations and sponsors also find themselves in a dilemma, as the expectations of donors and sponsors can influence the work of the museum and how it fulfils its obligations to the community (Frey and Meier 2006, 1030). In general, such an approach pushes the museum closer to profit-oriented institutions and their methods. Furthermore, such a strategy can potentially impose a heavy burden on management and marketing, it can lead to compromises with respect to the mission statement, and it can impose a focus on performance indicators (Lindqvist 2012, 11). At the same time, however, this also creates an interface with sustainability management. A more impact-oriented way of working and the introduction of sustainability performance indicators can create ideal conditions for such a diversification strategy.

The funding of museums is usually based on long-term planning and arrangements on the part of the funders. So political decisions, especially in the case of museums that are state-owned or largely dependent on public funding, often play a key role in economic sustainability. Given this, political lobbying is probably the single most important tool for ensuring economic resilience and secure long-term funding. The effort involved is usually considerable and the time horizons are long. In addition, success can be highly dependent on election results, on the turnover of relevant political actors and on changing priorities (Lindqvist 2012, 12). For implementing sustainability in museums, political lobbying not only provides further points of contact, but also additional partners, new potential coalitions and more target groups and political responsibilities. Sustainability thus expands the scope and the prospects of success for political lobbying for museums. This also illustrates the increasing importance of museum associations and representatives. At subnational, national and international levels, museum associations should seize the opportunity to re-frame their lobbying work through a stronger focus on sustainability, and at the same time should take this as an incentive to further intensify this work in order to increase the institutional resilience of museums over the long term.

Economic benefits from sustainable operations

There are numerous studies and examples that show that sustainable management has positive impacts on the economic performance of an institution. These impacts include:

- reducing costs,
- creating new income sources,
- promoting innovation processes in the institution,
- enhancing reputation and brand value,
- increasing the attractiveness of the institution as a place to work.

In the museum sector, too, there is initial evidence that sustainability management goes hand in hand with an improvement in long-term economic performance (Pop et al. 2018, 82). However, most cost savings are not immediately apparent. Once measurement approaches such as life cycle costs (LCC) and total cost of ownership (TCO) are applied, the positive economic effects of implementing sustainable practices often become clear and quantifiable very quickly. Long-term evaluations are needed to identify the benefits of a shift towards greater sustainability (Hodges 2005, 312).

The introduction of sustainability management can also generate revenue opportunities. In museum shops, smart ways of merchandising can be developed, and products such as gifts made from up-cycled materials can be put on sale. Focusing on new areas of the museum's impact can also generate further revenue opportunities or expand existing ones. For example, the further development of a dialogue forum as a social agora can increase income from rentals and events.

In general, a diversification of the funding structure requires targeted marketing that, in the context of the sustainable museum, aims to identify donors who are in line with the institution's beliefs with regard to sustainability. In addition, there will be supporters who are specifically concerned with sustainability, for example in the area of sustainable buildings (Sutton and Wylie 2008, 137).

In the future, it should be easier for sustainable museums, with their stronger focus on their impact on society as a whole and the services they provide for it, to receive funding and acquire donations. If credible and verifiable services are provided that go beyond the museum's core tasks, other public and private funding sources and donors will open up almost automatically. While this approach may initially apply primarily to temporary project funding, in the medium and long term this could certainly also affect the core funding of museums and ensure permanent public funding. For publicly funded museums, the use of taxpayers' money is an additional factor: if museums take measures that enhance their services to society and thus their legitimacy, this will also have a positive impact on their financial situation in the long term (Lindqvist 2012, 13). Overall, a focus on sustainability also facilitates access to new opportunities and collaborations which can also have a positive financial impact (Sutton and Wylie 2008, 138).

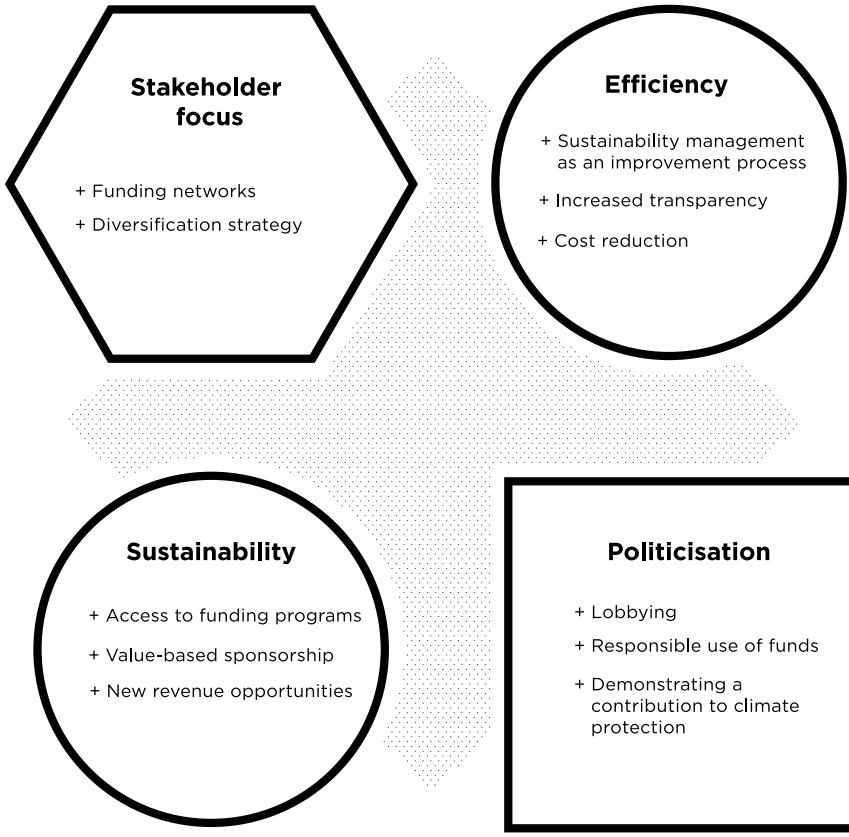

Figure 6.1 Building blocks of financial resilience.

Even if it is in many places an illusory goal to set up museums which are so financially resilient that they can survive coming crises without public support, sustainability in the financial field as a whole can nevertheless be understood as an approach which at least channels financial resources into projects and organisational changes that both increase sustainability and improve the long-term stability of museums (see Figure 6.1).

Sustainability accounting as a driver of organisational transformation

Traditional accounting involves ways of evaluating, measuring and monitoring the financial activities of an organisation. However, it does not reflect the values relevant to a sustainable museum and is therefore only to a limited extent suitable for accounting in a sustainable museum. Sustainability accounting supports the transformation of an institution, as it draws attention to unsustainable practices from a financial perspective and is a key source of information for decision-makers (Laine et al. 2021, 24). Sustainability accounting transposes approaches and concepts from sustainability management to the financial level and thus integrates sustainability into the economic decision-making system of

the museum. The aim is to refine the methods and tools of traditional accounting in such a way that they reflect sustainability considerations. While many questions remain to be clarified in the elaboration of the interface between accounting and sustainability (Bebbington and Unerman 2018, 22), there are nevertheless some promising models, such as the Sustainability Balanced Scorecard (Laine et al. 2021, 59), a full cost accounting system that aims to internalise externalities, and the common good accounting approach.

Common good accounting is based on the understanding that the goal of sustainable economic operation and management is not only financial success. Rather, it is about successful management at all levels with the common good as the yardstick. Common good accounting goes beyond financial accounting and builds a bridge to sustainability reporting (Felber and Maskin 2015, 21–24). Conducting a common good audit is based on twenty aspects of the common good, which are derived from a matrix of important stakeholders and the four core values of human dignity, solidarity and social justice, transparency and shared decision-making, and ecological sustainability (see Blachfellner et al. 2017). Common good accounting is thus comparable to other environmental management systems (EMAS, ISO), quality management systems (EFQM, Balanced Score Card) or standards for sustainability reporting (GRI). The difference is that the common good accounts then replace what was previously the main set of accounts, i.e. the museum's financial accounts. The financial accounts then only supplement the actual (common good) accounts of the museum's performance by reporting on monetary aspects. This makes common good accounting fundamentally different from other approaches that compete with mainstream financial accounting. Because of this competition, the introduction and adoption of environmental management systems such as EMAS or sustainability reporting in line with GRI is usually on a voluntary basis, as they can potentially have a negative impact on the bottom line, i.e. the financial balance sheet (Felber and Maskin 2015, 28–29). Because of its user-friendliness, this approach could help small and medium-sized museums in particular to quickly gain an overview of the relevant financial and non-financial effects of museum activities without a high initial financial outlay (see Meynhardt and Fröhlich 2017, 174).[2]

In a next step towards sustainable accounting, the entries in the common good accounts can be given a monetary equivalent. A key consideration here is the inclusion of externalities. Including externalities leads to an environmental-economic evaluation of museum activities, for example through cost-benefit analyses, which can be used in museum accounting (see dazu Bennett and James 2000, 31). There are various approaches to the identification and quantification of external costs. One concept that focuses on environmental externalities and is also applicable to museums is the Natural Capital Protocol (Natural Capital Coalition 2016). Often, however, external costs cannot easily be defined in monetary terms and are therefore not reported in financial reporting or accounting (Unerman et al. 2018, 514). While external costs are usually difficult to calculate, internal sustainability-related costs can always be integrated into the accounting system (Bennett and James 2000, 56). As the scientific and then the resultant economic

assessments of the consequences of the global crises become clearer and more tangible, the financial internalisation of certain costs will increase. How far and how fast this scientific and methodological process is driven forward depend not least on changes in societal values (Unerman et al. 2018, 514) to which museums can contribute.

Museums as degrowth pioneers

If a Great Transformation includes abandoning the growth paradigm, the question arises as to what impacts the post-growth society will have on the economic future of museums. Underlying the post-growth approach is an analysis showing that growth and excessive consumption cause global environmental damage and social inequalities (Andriotis 2018, 107). The concept of post-growth (degrowth) seeks "responses to the biggest dilemma of our times: reconciling our aspirations for the good life with the constraints of a finite planet" and focuses on "finding a credible vision of what it means for human society to flourish in the context of ecological limits" (Jackson 2009, 3). Degrowth places a holistic understanding of well-being and the good life above materialistic goals. Degrowth questions the crucial importance of economic growth for people's well-being and the good life, and instead suggests alternative concepts and ways of improving human well-being (Cosme et al. 2017, 322). These include the belief that "small is beautiful" (Schumacher 1975).

At the core of the mission of collecting lies a nucleus predicated on continuous growth, which stands in contrast to degrowth. A constantly growing collection needs new spaces for storage and exhibition. Without this being called into question, growth is therefore the goal of many museums. In this light, it is not surprising that the economic growth paradigm is also manifest in the museum sector in the form of ever more and larger new buildings and extravagant blockbuster exhibitions. It seems obvious that the consumption of resources triggered by such growth is not sustainable. This makes it clear that such an understanding of collecting can have negative effects on sustainability.

By abandoning the constant expansion of visitor numbers, collections and money, and moving towards moderate or even zero growth, museums can contribute to a post-growth economy of the future (Janes and Sandell 2019, 10).

While more and more insights and approaches are available on how to implement degrowth approaches at the macro level, i.e. a stable economic system without growth, there is only limited preliminary knowledge of how to run successful institutions without growth. Recommendations include the following (see Seidl and Zahrnt 2010):[3]

- aligning the size of the museum with the market,
- focusing on quality,
- making organisational processes more flexible,
- intensifying the contact with visitors through participatory mechanisms,
- focusing internal development on innovation and quality.

In the future, it will be important to explore how museums can contribute to sustainability by means of a post-growth strategy with regard to their collections but also, and above all, with regard to their basic operational and financial model (Mairesse 2010, 56).

6.2 Sustainable procurement

Sustainable procurement is a "process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life-cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment" (United Nations Environmental Programme 2017, 1). Procurement by museums using public funds should always serve as a model for procurement by private sector actors (Brandl 2011, 403). Museums therefore have a particular obligation to implement sustainable procurement practices (see Figure 6.2).

Implementation and procedure

Sustainable procurement includes extensive internal preparation, followed by market research and preliminary discussions, and finally tendering and awarding. Internal preparation includes the following steps (Sönnichsen and Clement 2020, 15):

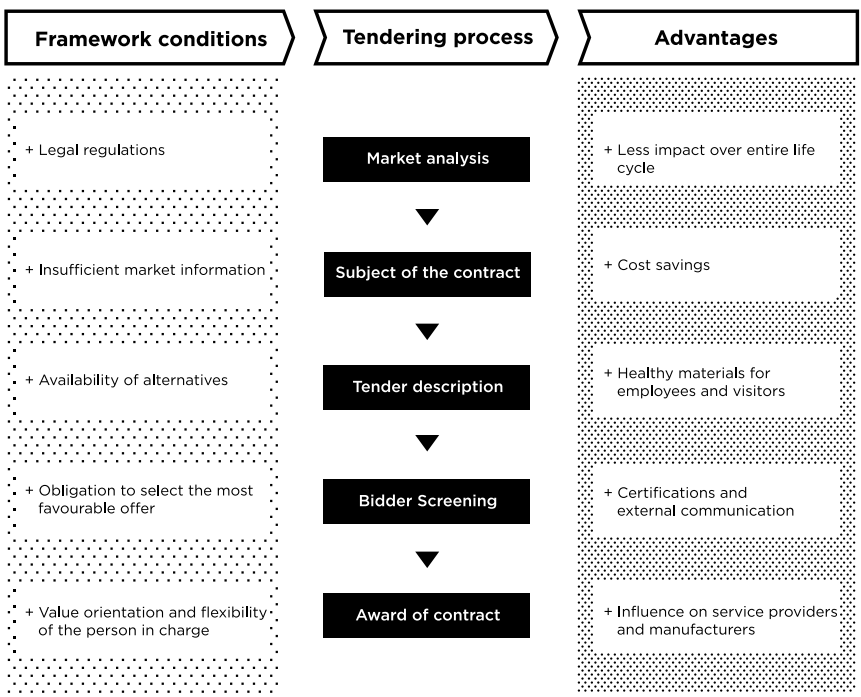

Figure 6.2 Sustainable procurement in the museum.

- establishing internal processes and capacities for sustainable procurement,
- defining general procurement criteria,
- developing internal procurement guidelines,
- developing and maintaining information to be included in the terms of reference, selection criteria and award criteria.

The following remarks on the implementation of a sustainable procurement policy are largely based on Clement (2011, 2016)[4] and Sönnichsen and Clement (2020), who propose in-depth market research and initial preliminary talks as a first step. The aim is to build close relationships with service providers and suppliers. This involves communicating the requirements with regard to sustainability and telling potential service providers which sustainability goals are to be achieved. The scope for achieving these goals can then be discussed together. Many service providers can assess alternatives better than those charged with procurement in museums. This intensive exchange with suppliers is a key element in implementing sustainable procurement when sustainable products and solutions are not readily available in general. In contrast to conventional tender procedures, it takes significantly longer to submit successful bids, because bidders need time to research, adapt or develop solutions (Clement et al. 2011, 10–11). It is therefore important to give service providers enough time to prepare. New suppliers may also have to be considered and contacts established with them. Small companies in particular often offer innovative sustainable solutions. In order to implement sustainable procurement in the long term, central service providers who share the same values and convictions are often helpful (Sönnichsen and Clement 2020, 15). The advantage of such a cooperative tendering procedure lies above all in dealing with risks, which are proactively discussed and clarified with potential bidders in advance (Walker and Loosemore 2003, 121).

A tender procedure details specifications or requirements for the product, its manufacture and possibly its entire life cycle, as well as requirements for the bidder. Requirements for products and services may include energy efficiency, materials, certifications and seals, as well as stipulations regarding recycling and disposal. A positive list or a best-in-class principle can also be used to attract bids featuring particularly sustainable materials or products. Requirements regarding manufacture may include ecological and social standards along the supply chain. Ideally, a life cycle analysis can be included in the tender procedure, as well as other criteria such as CO_2 emissions. The requirements for service providers and suppliers routinely include compliance with environmental or social standards and can include the use of an environmental management system. With regard to the requirements regarding the size and turnover of the bidders, it is important not to exclude small and innovative companies so as not to lose out on their expertise. It may be necessary to reduce the size of the lots or to encourage bidders to form bidding consortia (Clement et al. 2016, 50).

If permitted by public procurement law, requirements regarding the product or service sought should always be included in the details of the tender. This ensures that only bids that meet the sustainability requirements can be

considered. Tender invitations that require new and innovative solutions have a major impact on the field of service providers (Sönnichsen and Clement 2020, 10).

Challenges for the museum

The person responsible for procurement has a key function within the museum for the successful implementation of the policy. Since this person's convictions and values have a great influence on the design of a museum-wide sustainable procurement policy, the person who holds this position within the institution should be selected very carefully within the framework of the wider human resources policy. Studies from various cultural circles also show that the attitude of senior management towards procurement issues is often the decisive barrier to a sustainable procurement policy (z.B. Islam et al. 2017).

One of the most important challenges for sustainable procurement in museums is the need first of all for a change in the mindset of the person in charge: for a budget manager in purchasing, not only do the advantages of sustainable procurement need to made clear, but he or she must realise that it is not only the lowest price that matters (Clement et al. 2016, 15–17). For publicly funded museums in particular, raising awareness about the true cost of an acquisition – which includes the total cost over the life cycle, rather than just the purchase price – is a challenge. Establishing this perception is more difficult in museums, as annual budgets often do not provide an incentive for long-term savings. In addition, budget responsibility for acquisitions and for running costs is often split between different departments. Transparent communication about life cycle costs to all departments is helpful in overcoming this. A second barrier to sustainable procurement is a lack of information about the market. Sustainable suppliers and products are usually highly innovative and an up-to-date overview of the market requires in-depth research, which those responsible for awarding contracts in museums are often unable to undertake. If information on alternative products is lacking, they cannot be recommended and purchased. This hurdle explains the fundamental need for a more participatory and consultative procurement process. With such a pre-procurement process, museums can assess the benefits, risks and costs of sustainable products before the actual tendering process (Clement et al. 2016, 17). The third central challenge is long-established, entrenched and inflexible procurement procedures and processes that have proved very reliable and can be carried out quickly. It is characteristic of this situation that the people with responsibility usually behave in a risk-averse manner, as they want to avoid the uncertainty associated with different award criteria and evaluation rules under sustainable procurement (Cheng et al. 2018, 781). This means that familiar procedures are often preferred, as those bearing responsibility do not want above all to risk any legal conflicts (Sönnichsen and Clement 2020, 12).

Especially for small museums, lack of financial resources is a barrier to the introduction of sustainable procurement, as building up structures and expertise in this area can be costly (Grandia et al. 2015, 243).[5] It is therefore

advisable to select a single product group or a small number of them as a starting point for sustainable procurement. For this purpose, products for which numerous more sustainable alternatives are available are one of the options. Another option is to choose products that cause obvious non-sustainable impacts (Robert and Schmidt 2015, 12).

Life cycle analysis

Using life cycle analysis and making selection decisions based on the analysis is an important tool for sustainable procurement. Life cycle analysis maps the environmental impacts of a material, product or service, from production through to disposal. This means that all aspects of the entire supply chain as well as upstream and downstream impacts are also included in the decision. Life cycle analysis is an instrument for gaining a realistic picture of the environmental impact of the materials and products used, for example in restoration or exhibition construction. The ISO 14044 standard defines requirements for ecological accounting, or life cycle analysis. In particular, it addresses questions of the scope and boundaries of accounting. It thus represents a narrowing of focus onto the ecological impacts. Sustainability analyses that include social accounting and life cycle costs in addition to ecological accounting should be used whenever possible, though at present such analyses are even more challenging and less widespread (Klöpffer and Grahl 2014, 370).

Life cycle costing (LCC) takes into account all costs associated with an object or building and is also one of the core tools of sustainable procurement. In contrast to life cycle analysis, LCC also takes into account the service life of materials compared to environmentally preferable alternatives. They thus map total costs more accurately (Hodges 2005, 318–319). As a procurement criterion, life cycle costs offer an important basis on which sustainability and long-term cost security can be combined, especially for museums with large numbers of visitors. Life cycle costing is therefore particularly relevant for financial evaluation and decision making.

Even though there are numerous tools and templates available for creating in-house assessments of products (bspw. Adell et al. 2011), this is a very time-consuming process and requires in-depth expertise that may not be available in the museum. For the practical implementation of sustainable procurement, there is therefore a great need for the results of life cycle analyses to be pooled and for access to this information to be facilitated. A database is currently being developed that will provide a first step, especially for materials used in conservation work and for relevant aspects of exhibitions (see Nunberg et al. 2019).

The purchase of goods in museum shops

In the spirit of sustainable procurement, the goods on offer in museum shops should be local or regional, made using unimpeachable resources and ideally should be recycled or upcycled. Especially under consumer capitalism, the

products purchased in museums are very much a showcase for the museum. As an institution that places materiality and objects at the core of its activities, a museum should of course pay special attention to the objects on offer in its shops. In fact, however, the product range is usually seen as detached from the mission of the museum and does not receive the attention it should. In general, the meaning and perception of museum shops is likely to change, because while in the past they were primarily regarded as an additional source of income, in future they are likely to be much more closely integrated into the overall concept of the museum (Mottner and Ford 2005, 838) and to be regarded as an important tool for the fulfilment and communication of the museum's mission, its educational mandate and its commitment to sustainability. If, on the basis of an internal sustainable procurement policy, closer attention is paid to the life cycle analysis of the products, for example, then it is possible that lower profit margins will be achieved.

6.3 Buildings and resource use

The museum buildings often account for a large share not only of the costs, but also of the environmental impacts. Facility management maintains and controls the physical infrastructure of the museum, provides for a safe, healthy and productive workplace, ensures the safe storage of the collection and creates the conditions for a pleasant visitor experience (Hodges and Sekula 2013, 18). Sustainable facility management essentially comprises the following tasks and challenges (Shah 2007, 42):

- the integration of sustainability aspects into all building-related processes and internal services, such as cleaning and maintenance of technical equipment;
- resource and waste management, in particular the reduction of energy consumption and the use of renewable forms of energy;
- procurement and supply chain management, in particular ensuring that sustainability criteria are incorporated into the supply chain;
- ensuring sustainable standards in construction and refurbishment projects, in particular the use of life cycle costs as a basis for major (structural) investment decisions;
- the integration of social sustainability considerations in planning and operations.

The facility manager often has a prominent position because of their overview of the entire building and all related processes. In addition, they can usually draw on financial and strategic planning tools to support and implement sustainable practices. The facility manager can therefore be a key position for the development and implementation of sustainability policy and can have a long-term positive impact on the museum (Hodges 2005, 312). The division of tasks and responsibilities between procurement manager and facility manager is often fluid and variable. Even if no such specific position

exists in smaller museums, the role and its area of responsibility should nevertheless be carefully assigned.

Facility management as resource management

Due to the demanding climatic standards required for the storage and exhibition of collection objects and the associated energy consumption, museums are particularly resource-intensive institutions. But therein lies a great opportunity for cost reduction through more effective resource management.

Resource management includes issues relating to the land where the museum is sited and to water, energy and materials. The issues specific to museums – i.e. relating to collection and conservation – mainly concern the supply of energy and indoor air quality, while exhibition design mainly concerns materials and other resources. The aim is to reduce consumption and to re-use resources or use more sustainable ones. Examples of specific initiatives include (Sutton and Wylie 2008, 61ff):

- emissions reduction and energy efficiency: lighting, HVAC systems and renewable energies;
- integrated waste management: reducing, reusing, recycling;
- water conservation and management: reducing consumption, and reuse.

In addition to the ecologically significant reduction of resource use, sustainable facility management also addresses the social dimension of the museum building. A socially sustainable museum building not only enables as many people as possible to visit, but also promotes community and contributes to the enrichment of society (Greiff 2012, 12). Examples of what this means are good accessibility, including for users with limited mobility, and equal consideration of all target constituencies. Further aspects of a socially sustainable museum buildings policy include the participation of future users in the planning process as well as planning that promotes peaceful interaction between visitors and residents and communication between them (Greiff 2012, 39).

Resource management measures are particularly suitable for developing activities, information events and workshops for staff and visitors. In this way, the knowledge accumulated internally on these topics can be passed on. Every sustainability management measure can be translated into an educational programme for staff and visitors (Sutton and Wylie 2008, 116) and represents an opportunity to raise awareness of sustainability outside the museum.

Energy

Due to the associated high costs as well as its significance for greenhouse gas emissions, the control of energy consumption plays a key role in sustainable facility management (Hodges and Sekula 2013, 131). Reducing energy

consumption is an important step towards greater sustainability and lower operating costs.

The first step required is an analysis of the energy status quo. An energy audit of this kind takes into account the energy demand for HVAC systems, hot water and lighting. For this purpose, it can be helpful for museums to adopt tried-and-tested procedures from other sectors. For buildings in particular, there are numerous tools that can easily be applied to museums (Sutton 2019, 432). The relevant ISO standards on energy efficiency and thermal insulation (including ISO 91.120.10 and ISO 7946) must also be taken into account. Depending on the complexity of the building, comprehensive analyses can be helpful for identifying effective measures. These include infrared thermography, hygrothermal building models or thermal-energy building simulations, air flow measurements with indicator gas or special light simulations. Also potentially helpful are regional high-resolution climate models with which the effects of heat, humidity, sun and water vapour on the fabric of the building can be mapped (see Leissner and Fuhrmann 2016, 25). Indices such as the total annual energy consumption per square metre (energy use intensity) are often used to measure energy consumption. However, it may be more useful to link energy consumption more directly to the activities and services provided by the museum (Hodges and Sekula 2013, 132). For example, the size of the collection or the number of visits could also be integrated into the consumption indices.

The first starting point is making sure that the energy sources are appropriate. In addition to switching to a green electricity provider, the potential for using renewable energies, e.g. wind, solar or geothermal energy can also be examined. The use of near-surface geothermal energy, especially to support heating and cooling, offers great potential for tapping renewable energy sources for museums. This can save up to almost 50 per cent of energy costs, as simulation calculations have shown (Cadelano et al. 2019, 3192).

In order to reduce energy consumption in museums, successful approaches from other sectors can be applied. There are detailed recommendations on energy savings for office workplaces and more generally on the design of "green workplaces" (Stringer 2009; Paillé 2020; Gordon 2001) as well as for energy-efficient laboratories. Recommendations for ecologically sensitive digitalisation can also be adapted to the working environment in museums. These include, for example, the use of green providers and data centres. In addition, there are recommendations specific to museums, especially for collections and exhibitions. In order to reduce energy consumption in museums, the following parameters in particular can be analysed and optimised:

- air-conditioning technology and HVAC systems (vgl. Kap.7.3);
- lighting and the use of daylight. Regardless of the requirements of the specific collection or building, it is possible to review how daylight can be used for differentiated daylighting;
- the energy consumption of AV systems. Accredited and energy-efficient AV technology reduces energy consumption in exhibitions (vgl. Kap.9.3).

Besides reducing energy consumption, the following aspects must also be taken into account: the hours of use and possible variations in energy prices at different times (e.g. night and day), peak demand and the variability of energy prices based on peak consumption, and programmes and incentives to reduce energy consumption (Hodges and Sekula 2013, 132–133).

Water and wastewater

In many regions with reliable public water supply, water is a relatively inexpensive resource and water shortages are often not yet a problem. Reducing water consumption is therefore less intensively pursued compared to energy consumption. But water and wastewater management will become more important as an element of facility management precisely because water will be a scarcer resource in the future and the cost will rise in many regions (Hodges and Sekula 2013, 148–149).

The concept of the water footprint provides a good way of measuring and evaluating water use (Hoekstra and Chapagain 2011). This not only maps direct and indirect water consumption (the blue footprint), but also includes the pollution of water (the grey footprint). However, the water footprint ignores water availability, which will become a serious challenge in some regions of the world in the future (Bringezu 2018, 19). As with reducing energy consumption, it is necessary to measure the water consumption of different consumers within the museum in order to develop appropriate measures for reduction and to manage the costs incurred for water and wastewater in the museum. With comprehensive water management, 10-30 per cent of water consumption can be saved (Hodges and Sekula 2013, 153).

The water footprint of products and services also plays a role for museums. This is often significantly larger than the footprint of the museum operation itself. However, it is more difficult to reduce water consumption by service providers because measures cannot be implemented directly (Hoekstra and Chapagain 2011, 106). It is therefore important to find other ways to reduce it. Water management measures include avoidance, reduction and, if possible, treatment before disposal. More efficient components can contribute to savings. For example, the production of wastewater can be reduced by using grey water. Another approach is to save water by changing the behaviour of users (Hodges and Sekula 2013, 149).

Materials and waste management

With regard to materials and waste in the museum, the idea of the circular economy, or the cradle-to-cradle principle, and sharing and exchange schemes are important approaches. More specifically, the 3R concept should be the guiding principle for dealing with materials and waste: reduce, reuse, recycle.

These approaches can be adapted and implemented for museums by means of an integrated waste management strategy. As in other areas of resource management, the first step involves an analysis. For this purpose, there are various

different ways of conducting a so-called waste audit, none of them specifically designed for museums. They make it easier to determine the relative proportions of different types of waste and to identify the potential for a waste management scheme. The most significant sources of waste in museums include:

- packaging and shipping material,
- waste from collection and conservation activities,
- temporary exhibitions that have ended and the remnants of the exhibition structure,
- refuse and organic waste from catering.

When it comes to implementing measures, the order of the 3R concept is not arbitrary. Essentially, as in other areas of the museum, the priority is reduction. For example, only if packaging cannot be entirely dispensed with should reuse be considered – recycling is the last and worst option. Reduction is the simplest and most effective approach, as it prevents waste from being generated in the first place. However, the importance of reduction goes beyond its immediate application: waste reduction also has a transformative potential in that it makes people reflect on their consumption behaviour. Individual behaviour and how to change it plays a particularly important role when it comes to waste; in this context, workshops can help to integrate opportunities and approaches to waste reduction into everyday working life. As a second step, it should always be considered whether materials or products can be re-used or re-purposed in another form or at another location. Two good examples are reusable gloves and modular display systems. Also relevant here are ways of extending the lifespan of products and investing in repairs. Repair cafés are one idea that can also be used for products in the museum. As the last link in the chain, recycling and disposal service providers should also be included in any waste management strategy. Here it is important to compare local facilities and disposal companies and to select among them according to sustainability considerations.

Renovation and new construction

The refurbishment of a museum building is a complex project, because the functions and requirements of museums overlap here in exemplary fashion. First of all, the building must meet the conservation requirements. At the same time, it has to offer staff and visitors an appropriate interior climate and ensure adequate lighting for the exhibitions. Often, these requirements are set within the regulations for the protection of historical monuments, which set limits on what is possible.

In order to weigh up these complex and sometimes contradictory requirements, measurements of the indoor climate and lighting situation are needed, if not already available. Simulation programmes can help in calculating both the indoor climate situation following the renovation and the energy consumption required to maintain it. Different options can be devised on the basis of dynamic simulations, especially for specific parts of the building.

Based on the results, all stakeholders in the planning process can discuss and evaluate the different options. The challenges and possible solutions for balancing indoor climate conditions and conservation requirements are discussed in Chapter 7.3.

For an assessment from a sustainability perspective, the entire life cycle of the building must be taken into account. Although energy consumption and emissions during the production of building materials and the construction phase itself cannot be ignored in the course of a life cycle analysis for a museum, representative studies have shown that the bulk of the energy consumption occurs over the operating time span (Ge et al. 2015, 127). In addition to life cycle energy consumption, the total cost of ownership (TCO) should also be considered, which captures all the costs of the museum building from planning, design and construction, through operation and maintenance, to the replacement of systems or renovation. It should be noted that staff costs often make up by far the largest part of total operating costs. Another major element in the calculation of the TCO is the service life of building parts, systems and materials. It is therefore necessary to obtain detailed information on the longevity of these elements to enable decision-making (Hodges 2005, 316). In order to minimise the TCO, it can be worthwhile for museums and archives to adapt traditional building techniques and design solutions to today's requirements. A clever mix can generate highly innovative solutions for both renovations and new buildings (see Crimm et al. 2009, 125). Selecting and balancing between building-related measures, options and modifications can be carried out by the facility manager on the basis of the LCC and TCO methodology. The (ecological) follow-up costs should already be taken into account in the planning phase, especially since subsidies are often available for modernisation and construction projects, while maintenance costs then have to be covered from the museum's regular operating budget.

The new role of facility management in the sustainable museum

Facility management plays an important role in overall sustainability management, not only because of resource management and its relevance for climate accounting. The collection and processing of key performance indicators for the building are important data for monitoring the sustainability programme. They also serve to support a wide range of decision-making processes. Consequently, facility management will develop into an increasingly data-driven function in which the incoming data on services and consumption must be analysed and processed, on different time horizons, for the purposes of internal and external reporting (Shah 2007, 41). Digital building management systems can support this development by enabling the monitoring and management of building services equipment. Smart building technology can help in the creation of a building that is both energy-efficient and adaptable (Atkin and Brooks 2021, 270).

Facility management must also comply with legal requirements and take external certification systems into account, while at the same time being increasingly responsive to the expectations of stakeholders. In addition, other partners also use certification systems and need to implement related measures that have an impact on the building and the work of facility management. Facility managers face the challenge of involving the numerous stakeholders in the process of creating a more sustainable building. These include, among others, funders, regulators, contractors and suppliers, other businesses, cooperation partners, clients, employees and senior management (Roper and Payant 2014, 209). Coordinating these diverse requirements, objectives and guidelines is becoming an increasingly important task (Shah 2007, 38).

In the future, more and more building-related services will be contracted out or outsourced. This poses another challenge for facility managers and for procurement managers, as sustainability criteria have to be integrated into such contracting procedures. This can make the task of finding contractors more difficult – and increase costs (Roper and Payant 2014, 537).

As a general rule, the facility manager is given the target of operating the building at the lowest possible cost. But when it comes to buildings, measures to improve resource efficiency often entail unavoidable investments. Here, facility management faces the challenge of making the case for such investments by demonstrating short-term efficiency gains, medium-term environmental improvements and long-term cost savings. For this, facility managers need to know and understand the financial planning and accounting systems of their institutions in great detail in order to be able to develop measures relating to the building in such a way that they bring economic benefits to the institution (Hodges 2005, 316).

In order to meet these new requirements, facility managers, especially in large institutions, need personnel support. The additional activities will require skills and competences above all in data processing, data science and communications.

Toolbox

Sustainable practice | Management and operations

1 Switch to a renewable energy supplier.
2 Switch to LED lighting, use motion sensors and adapted daylight dampening.
3 Draw up a sustainable procurement strategy.
4 Establish cooperation with companies that are committed to sustainability and offer services and products reflecting this commitment.
5 Offer only sustainable and fair-trade goods in the museum shop and organic and regionally sourced food in the catering outlets.

Notes

1 Based on management research on resilience.
2 Drawing on recommendations for non-profit management.
3 Based on degrowth recommendations for companies.
4 Based on general recommendations on sustainable procurement.
5 Based on public procurement evaluations.

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7 Realigning collections and sustainable conservation

Collections are of particular relevance to the environmental impact of museums. Their conservation is responsible for a large proportion of the effects on the climate. In order to reduce energy consumption, the optimisation of heating, air-conditioning and ventilation technology is particularly important. In addition to this, a new debate on collecting in general and on conservation standards in particular is needed. Can collections shrink in size while still fulfilling the core task of conservation? Can climate corridors be extended without endangering the conservation of items in the collection for future generations? Conservators, restorers and curators have an important role to play in weighing up these questions and shaping the future of the museum, especially when collections are the core and centrepiece of a museum (see Keene 2002, 248).

	Vision
Identity	Preserving and using cultural and natural heritage for social transformation
Expertise	Stakeholder integration, risk management and problem-related object knowledge
Practice	Re-contextualising, reducing, maximising benefits, opening up

7.1 The need for a hermeneutic re-vision

In a globalised world with increasingly diverse societies, a re-evaluation of collections from a museum ethics perspective seems to be called for. Such a new hermeneutics would ensure, on the basis of a preceding analysis, that the diversity of people and their perspectives and narratives are reflected in the collections and in the museum as a whole.

Collections, the basis of many museums in the Global North, are often not only the result of bourgeois emancipation, but also arose against a backdrop of asymmetrical power relations during the colonial era – this applies to a lesser degree to collections of everyday culture and to other collections such as contemporary art. Nevertheless, the work behind the collection, the way it is presented and the way it is mediated were and are often shaped by a Eurocentric,

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or at least Western, perspective dominated by the Global North. Similarly, the narratives conveyed through and with collections are often shaped by unequal power relations – from the regional to the global level – and the perspective of the more influential and sometimes elitist actors. Due to this historical background to the creation as well as the long-standing practice of interpretation, museums are increasingly re-appraising these historical backgrounds and re-conceptualising and re-contextualising the objects in the collection as well as the work of the museum as a whole. The global dimensions of the multiple crisis make such a re-vision more necessary than ever before.

De-colonisation and re-contextualisation

Such a re-orientation of museums and collections involves, among other things, de-colonisation (see z.B. Onciul 2015; Chambers 2014; Edwards et al. 2006), but that is not all. It includes the contextual embedding and interpretation of objects, as well as the narratives that are developed with and around them. Working together with the communities where the objects originated and involving indigenous people is another of the tasks of re-contextualisation. De-colonisation also means using the objects to tell the uncomfortable truths of colonisation, oppression and exploitation. This can be the starting point for an engagement with history and thus for a contribution to a genuine de-colonisation in the here and now (Lonetree 2009, 334).

The historical circumstances by which objects entered the collection can be recorded through provenance research and then analysed to determine whether a constellation of imperialism, colonialism, war in general or looted art in particular played a role in the process. Such problematic object histories include (Bienkowski 2015, 433):

- objects originating from a colonial context,
- illegal acquisition or robbery in the course of acts of war,
- symbols of the cultural identity of a community of origin,
- changes to national borders,
- uniting different parts of an object,
- claims to property rights on the part of individuals.

The results of research into provenance as well as a reassessment of objects in terms of museum ethics inevitably lead to consideration of the restitution of collection objects. In the interests of sustainable collecting, restitution and repatriation should become the rule for museums and not the exception. This could also be accompanied by making the restitution process uncomplicated, unbureaucratic and rapid. In addition, the process should be based on a cooperation between the parties on an equal footing – as opposed to the current property owner enjoying a privileged position, as is often the case. The deliberative democracy approach can serve as a guideline for a restitution process that accords with the basic concept of sustainability. A deliberative process is characterised by inclusiveness and participation with regard to the communities of

origin, an equal and open dialogue about the value of objects and joint decision-making structures (Bienkowski 2015, 447). Such a process is very demanding, but builds precisely on the changes that are required anyway by sustainability management. Ideally, restitution should be embedded in a close cooperation with the community of origin, one that then also leads to a long-term relationship and lasts beyond the act of restitution itself (Bienkowski 2015, 432).

Indigenous perspectives can be further strengthened in collection work by treating objects and narratives from indigenous peoples with respect and sensitivity. In particular, the cultural practices of the communities of origin must be considered and respected. In many indigenous communities, the conservation and maintenance of cultural heritage are important tasks that are taken on by members of the community who have been specially trained for this purpose. Different approaches to cultural heritage management need to be combined here. This relates to how objects are handled and how they are used in cultural practices, for example. The Western scientific perspective on collecting, which is that objects are best preserved when they are not used and are stored in a protected way, often does not correspond to the understanding of conservation within the communities of origin (Onciul 2015, 120–122). Indigenous perspectives can only be credibly enforced in the exhibition context if there is close collaboration with indigenous communities. Here, as in the process of re-contextualisation and de-colonisation as a whole, it is very important not to consolidate – perhaps even unconsciously – outdated and dominant patterns of white, Western supremacy. Cooperation with communities of origin and indigenous people should not serve – or at least not principally – to integrate their perspectives into the museum's interpretation and communication and thus to make exhibitions more exciting and better; this could also help to consolidate asymmetrical power relations and to benefit one side only.

Against this background, Golding focuses precisely on the opportunity for museums to seek out issues of human rights, humanity and diversity in the collections and to use them to raise issues such as racism for discussion. In this respect, museums can become a place where local ideas and ways of life are given a space and social justice and human rights are promoted through curatorial work of this kind (Golding 2013, 14).

Guardianship and dynamic conservation

Consideration of acquisition contexts and return processes can also lead to new approaches towards collecting and conservation (see Figure 7.1). A sustainable museum could focus more strongly on dynamic conservation. This includes the following aspects (Meijer-Van Mensch 2016):

- "guardianship": an ethic of stewardship;
- "shared ownership": the sharing of responsibility between museums and communities of origin;
- "protection in situ": protection at the original site, i.e. leaving objects where they are but contributing to their protection.

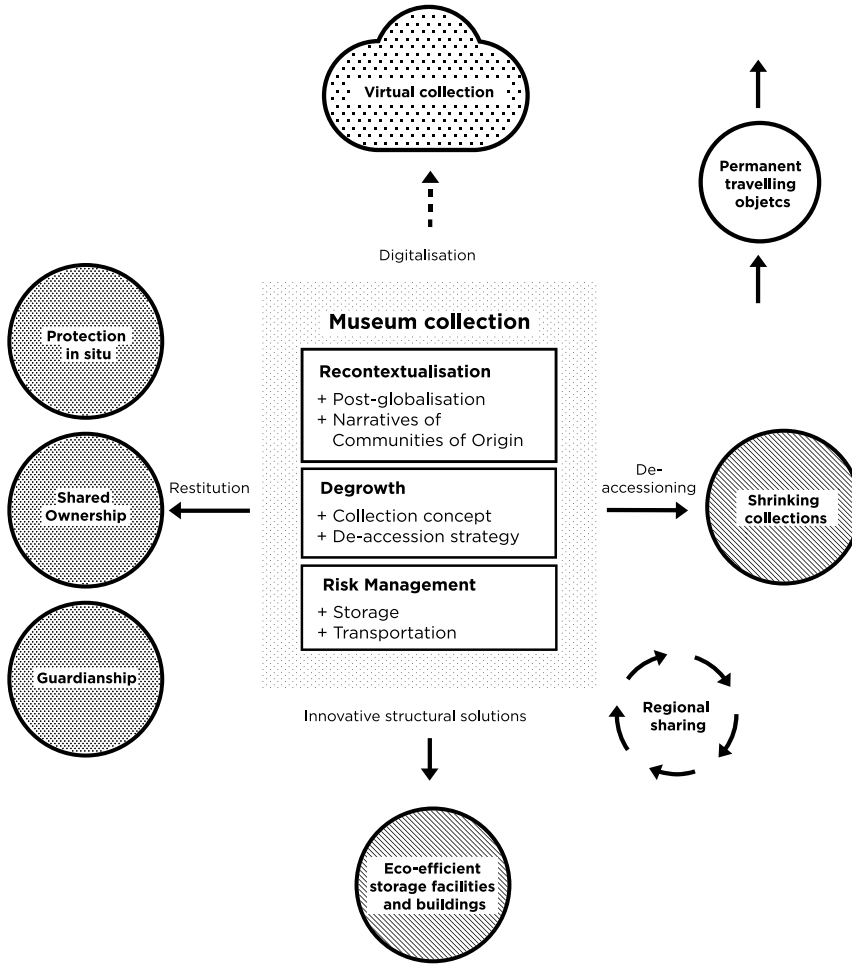

Figure 7.1 Collection and sustainability.

This new ethic of collecting is defined by a more fluid and open relationship between objects and experiences in the museum. This is accompanied by a shift from a sense of identity based on ownership to one based on safekeeping and guardianship (Marstine 2011, 17). The concept of guardianship or stewardship also allows for permeability and complexity in the cataloguing of objects, rather than limiting the meaning of collections within the constraints of databases and taxonomic conventions (Marstine 2011, 19).

The guardianship approach can also lead to an understanding of shared ownership and thus shared responsibility. Communities of origin and museums thereby take on joint responsibility for conservation (Meijer-Van Mensch 2015). This involves shared competence, emphasising the importance and authority of local communities in preserving their own cultural heritage (Kreps 2008, 203). This could lead, for example, to communities being given

privileged access to these objects or being given them back for a fixed period of time (Meijer-Van Mensch 2015). The protection in situ approach is more radical and entails a move away from collecting. It means leaving objects where they are, but helping to protect them.

Post-globalisation and digitality

The whole debate on restitution, return processes and new concepts of conservation inevitably leads to a fundamental reflection on the concept of ownership. For some cultures, collecting objects with the purpose of preserving them and displaying them in a museum context seems downright absurd, as they already have traditional and well-functioning mechanisms for the conservation of their cultural heritage and the objects associated with it. It is precisely the contrast between the Western concept of ownership and the way of thinking in indigenous cultures that offers an opportunity to develop shared ownership and protection in situ in cooperation with communities of origin (Tythacott and Arvanitis 2014, 6–7). This radical re-conceptualisation also departs from a materiality and an idea of collecting that only became possible due to colonial power relations and that continues to be manifested in the ongoing focus on objects.

For museums that subscribe to the understanding of collecting as stewardship and protection in situ, completely new opportunities also open up to engage their public as well as other stakeholders in support of sustainable development. In order to sensitise visitors to the richness of cultural heritage outside the museum building, the traditional exhibition and communication techniques of museum work can be re-thought. Innovative methods using digital media in particular offer opportunities here to connect the visitor experience in-situ with the museum (Manders 2008, 39). If the sharing economy means that museums do not want to bear the burden of ownership, then digital collections make the things they do not want to own available to the general public. This approach places museums at the centre of the sharing economy (see Merritt 2014, 45).

A reorientation of museums in the post-colonial era can also promote radical concepts such as a museum without objects, virtual museums or hypermuseums, where objects are only presented through media (Sola 2017, 257). Contextualisation, information and narration can be more easily adapted to reflect current developments and to allow for different perspectives. This creates a flexible exhibition space that can be more easily tailored to specific target groups as well as specific mediation goals. The post-colonial museum can also be thought of as a museum without a location, one that operates as a diffuse institution purely in the social realm (de Angelis et al. 2014, 18).

7.2 Degrowth and deaccessioning

The task of collecting implicitly entails a drive for continuous growth. So the critique of the growth paradigm and the discourse on post-growth is extremely relevant for museums, especially with regard to collecting. For collections,

post-growth means having a new and professionally informed discussion about deaccession, regardless of provenance and the circumstances of accession.

Collection strategy and growth

Museum collections are usually in a state of unbridled growth, with the rate of growth significantly higher than the rate of deaccession (Vecco and Piazzai 2015, 223). If unbridled growth can never be sustainable, then museums must find a way to integrate deaccessioning into their identity despite the risks involved. It is therefore a question of finding a sustainable collecting strategy that retains the aim of conservation for the future while at the same time taking into account the critique of the growth paradigm.

A sustainable collection strategy is based fundamentally on the idea of sustainability. It defines clear criteria for objects to be included in the collection and aims above all at a strongly controlled or restrictive growth of the collection in clearly defined areas. However, such a strategy incorporates not only specifically collection-related considerations such as downsizing, or post-growth, guardianship or restitution. It can also take into account the function that the objects may serve for sustainable development.

A post-growth strategy might also question the pursuit of completeness and representativeness. Instead, collections could be understood more as selected fragments, contingent on contexts of origin and created in part by chance (Merriman 2008, 17). While the vision of preserving a large collection for eternity may be maintained by the large national museums, smaller museums could in future pursue other collection strategies. They could take on regionally or temporally limited cultural functions and not necessarily orient their collection strategy towards a quasi-indefinite duration (Merriman 2008, 18). The collection strategies of museum associations offer a particular opportunity in this respect, as this is where duplications of objects can occur. By focusing in each case on the specimen in the best condition, it may already be possible to find here some sensible starting points for deaccessioning.

Simplifying deaccessioning

In order to downsize collections or reduce the number of collection objects, deaccessioning must be simplified, and it must be made easier for museums to get rid of their collection objects (Davies and Wilkinson 2008, 15). Deaccessioning is always preceded by a comprehensive examination in which the rationale for deaccession is assessed on the basis of an individual catalogue of criteria. The deaccession procedure must be documented for each object. This process of removal can take different forms, including return, transfer or long-term loan, donation, sale or exchange, but also destruction.

There are also different framework conditions for deaccessioning, which are rooted in part in the object's historical origins and institutional embedding in different cultural circles. Museums that operate as private institutions

and whose collections originate from private donations generally have lower hurdles for deaccessioning. If, on the other hand, collection objects originate from royal collections, or if museums are financed by the public sector and mandated to preserve cultural heritage, the hurdles for deaccessioning are usually very high.

The central criticism of the practice of deaccession is that it obviously carries the risk that collection objects will no longer be preserved for future generations. However, if growing collections and their financing become increasingly problematic, then future viability also entails the capacity to preserve collections for future generations in economic and other crises (Vecco and Piazzai 2015, 223).

New opportunities created by shrinking collections

Although deaccessioning is an important part of a post-growth strategy for museums, this does not necessarily mean radical deaccessioning and stopping the accessioning of objects completely; in fact, this would be contrary to museums' most basic mission. Post-growth also means above all: "doing more, and doing better, with less" (Latouche and Macey 2009, 55). A sustainable collection strategy can focus on new interpretations and new approaches to making the fullest use of objects in spite of shrinking collections. Growth could be understood in the future for collections as meaning not increasing the number of objects but the formation of more intensive and relevant relationships between the collection and visitors and other stakeholders, and the transfer of objects from museums into new contexts of meaning (Morgan and Macdonald 2020, 66). In an increasingly material culture that is also characterised by consumer objects, the collecting of everyday objects by lay people outside the museum will continue to grow. This development offers an opportunity for deeper collaboration with stakeholders and a starting point for discourses on collecting as an epistemological practice (Macdonald 2006, 92).

In summary, deaccessioning brings with it numerous opportunities; these include (Vecco and Piazzai 2015, 225):

- ethical benefits: constantly growing collection stocks are not sustainable;
- practical benefits: better accessibility and visibility from the perspective of the general public;
- financial benefits: lower costs for the collection holdings as well as additional revenues.

7.3 Archives, storage facilities, safeguarding collections and environmentally efficient processes

Collections essentially relate to sustainability in two ways: firstly, in terms of the social and ethical dimension, which has been discussed in the previous sections, and secondly, via their environmental impact. Storage facilities and archives consume the most resources within the museum and thus cause the

greatest negative effect in terms of the environment and climate (Abbey 2012, 107). One reason for this is that the safeguarding and conservation of objects and the care of collections as a whole are energy- and resource-intensive. Setting out on a transformation to sustainable collections therefore soon reveals the conflict line between conservation requirements with regard to the indoor climate and energy savings in air-conditioning technology.

Indoor climate and sustainability

In order to ensure the optimal protection of collection objects, museums today have to meet strict requirements regarding the indoor climate. These are based on the recognition that a stable environment, i.e. narrow environmental parameters, provides the safest conditions for the exhibition and storage of collections. Such maximally narrow climate corridors for the conservation of collection objects often result in fully air-conditioned buildings with enormously high energy consumption and CO_2 emissions. Although diverse climate classes offer sufficient flexibility (American Society of Heating Refrigerating and Air-Conditioning Engineers Inc. 2019) to meet the requirements for most collections, many museums adhere to the strict indoor climate classes (Kramer et al. 2017, 14). One reason for this is that guidelines and fluctuation ranges for the indoor climate were set in the past by the technical limitations of the air-conditioning systems rather than with regard to the requirements of the collection (Neuhaus 2013, 118).

Against this background, the debate has intensified – both among practitioners and academics – over how serious the risk really is for objects when parameters such as temperature and humidity fluctuate to widely varying degrees (see Bickersteth 2014). With regard to reducing energy use, the main issue is to determine how large the range of temperature and humidity variation can be before the objects are exposed to unacceptable risk (Weintraub 2012, 342–343). Using the motto "stable is safe", conservators argue that the current conditions are the result of decades of effort and that therefore no relaxation of standards should be permitted. On the other side of the debate, wider climate corridors are proposed together with individual solutions for the most sensitive objects (Bickersteth 2014, 218). On the whole, the research findings on the effects of environmental parameters on objects have to be described as inconclusive. In addition, the findings are often the result of experimental methods rather than being based on long time series surveys in museums. Overall, the current state of research has to be described as too inconsistent to serve as a basis for making confident decisions (Bickersteth 2014, 223).

Risk management

It therefore seems appropriate to abandon the precautionary approach and adopt a risk management approach instead (Staniforth 2014, 213). The acceptance of such risk management by insurance companies, including in

the context of loans, is a further development task for sustainable collection management. For risk management with regard to indoor climate requirements in museums, a wide range of information must be weighed up at the detailed level and combined with complex information at the macro level, for example on the building as a whole and the climate (Ankersmit and Stappers 2017, 9). Ankersmit and Stappers (2017) have developed a clearly structured process, which is outlined below, for decision-making with regard to the indoor environment. An environment and stakeholder analysis is conducted which involves all stakeholders and integrates their goals. The framework is set not only by standards and laws, but also by the requirements of loans and insurance policies. This is followed by an analysis of the value and significance of the objects. The climate risks for the collection objects and the building are then analysed and divided into classes based on sensitivity (Ankersmit and Stappers 2017, 10). Such a sensitivity analysis should first of all identify objects that have a high risk of being damaged by adverse climatic conditions, as well as objects for which an incorrect indoor climate can cause a large loss in value (Ankersmit and Stappers 2017, 272). The rights and expectations of the employees and the public are also defined.

The two key steps in risk management are the analysis of the building and the development of precise specifications. An examination of the building reveals the factors that are decisive for the indoor climate. For example, it is important to identify those aspects of the building that have the greatest influence on the indoor environment. The next step is to develop the specifications for the indoor environment on the basis of all the previously collected information and taking the stakeholders into account. Based on these specifications, different strategies are developed for their implementation in the building, e.g. in the form of climate zones and customised solutions for individual objects. The process concludes with a structured decision-making methodology, with the help of which the alternatives are weighed up against each other (Ankersmit and Stappers 2017, 10). Possible decision-making methods include multi-criteria analysis and cost-benefit analysis. Although it must be accepted that decisions regarding the indoor environment are fraught with uncertainty and that every decision involves some risk, structuring the process in this way and taking many criteria into account lead to better decisions (Ankersmit and Stappers 2017, 264–265). In their practical application to collections, these classic decision-making methods are supplemented with a consequence matrix which maps the possible effects on collection objects (Ankersmit and Stappers 2017, 249). This joint process of weighing up involving all stakeholders leads to a decision that defines the fluctuations in relative humidity and temperature that are permissible for specific areas of the building for the different seasons (Ankersmit and Stappers 2017, 201).

With regard to sustainable operations, it is essential that sustainability aspects are included in decision-making as part of the multi-criteria analysis. Furthermore, any extended cost-benefit analysis should also integrate consequential costs in terms of energy consumption and climate change. As important as the risk-based assessment and the discussion about possible damage

to collection objects is, a change of perspective might accelerate the process of change. A discussion focused on benefits could revolve more around the question of how sustainable development and social change can benefit from how the collections are exhibited and interpreted. A sound assessment of these positive effects should likewise be included in the deliberation process around the indoor environment in museums. The aim is to achieve cost-effective, energy-efficient indoor climatic conditions that are tailor-made for the collection and the building (Ankersmit and Stappers 2017, 186).

As developing an indoor climate strategy in this way is time-consuming and cost-intensive, the quickest and seemingly safest decision is often taken: it is assumed for the purposes of further planning that the collection will be mixed and, at the same time, highly sensitive (Ankersmit and Stappers 2017, 11). In contrast, tolerating greater fluctuations and more flexible temperature and humidity levels offers the possibility of reducing energy costs without cost-intensive renovation measures. It should be noted that the relatively straightforward modification of tolerance ranges does not mean sacrificing other savings potentials that might require a higher investment in HVAC systems but could lead to much more substantial energy savings (Weintraub 2012, 343).

Energy-efficient storage facilities

In the past, air-conditioning in storage facilities was aligned with internationally accepted standards which largely ignored the general condition and setting of the building as well as the outdoor climate. Sustainable air-conditioning supplements these standards with empirical knowledge of the specific local conditions. This results in a seasonal climatic regime, with higher fluctuations, which nevertheless ensures safe environmental conditions for the objects in the collection. The air exchange rate is one of the key parameters relating to sustainability, as it defines the amount of conditioned air and thus the size of the climate control system. A rethink is needed because the indoor climate in museums should reflect the local climate rather than international standards (Staniforth 2014, 216). This change in air-conditioning strategy should also be accompanied by adapted and resource-saving practical application: passive air-conditioning, such as natural ventilation, requires less technical investment and thus also means it is easier to operate. In contrast to active control of the indoor climate through air-conditioning systems, passive control using the physical properties of the building offers the advantage of being more durable and reliable (Neuhaus 2013, 118).

Although temperature fluctuations are the most significant factor in the decay of organic collection objects, numerous case studies of historical museums and archives as well as new buildings, in different climatic zones have shown that collections are not damaged by temperature fluctuations which, although outside the accepted norms today, can still be described as moderate. If the second most important factor, namely relative humidity, is controlled by dehumidification instead of by heating and cooling, then energy-efficient conservation options are available – at least for most locations

in temperate climates. Dehumidification can run on solar energy, and temporary extreme weather events can be managed by humidity buffering. This being the case, it is argued, it is hardly possible to speak any longer of a conflict between energy saving and conservation standards (Larsen et al. 2012, 58–60).

How the risk assessment outlined above is integrated into the planning phase is also crucial for the sustainability of new buildings. What is important is to pay individual attention to those objects with the greatest vulnerability to climatic fluctuations rather than planning the entire museum around them. Sensitive objects can be kept in special display cases that facilitate control of the interior climate, rather than air-conditioning the entire building according to the requirements of those objects. Integrating risks into planning also involves weighing up the likelihood of their occurrence against the cost of totally minimising that likelihood: energy consumption should be reduced in cases where the likelihood of occurrence is extremely low (Neuhaus 2013, 125). In addition, algorithms and energy simulation can be used to calculate the energy consumption of different climate classes in order to balance the risks for collection objects against the need for energy efficiency through ongoing dynamic adjustments to the air-conditioning technology (Kramer et al. 2017, 14).

With the increasing digitalisation of collections and the development of databases relating to the objects held, researchers and other stakeholders can access information, including images and 3D representations, without having to visit the object in storage. As a result, according to Sutton and Wylie (2008, 6), the physical collection object in the storage facility is used less often. In future, collections will therefore require less space, as objects can be stored more closely together. Alternative, energy-efficient approaches to the management of storage facilities can therefore be adopted. One example of this is the internal grouping of objects by construction material, which allows for simpler uniform climatic conditions and can lead to energy savings. The digitalisation of collections also presents a great opportunity for making archives more ecologically sustainable: the long-term conservation and secure storage of collection objects comes to the fore, while ease of access becomes less important – enabling space requirements and energy consumption to be significantly reduced (Sutton and Wylie 2008, 6).

In summary, the use of HVAC systems must be seen as a trade-off between the requirements for the conservation of cultural property and the consumption of resources. It is therefore a question of optimum, not maximum, risk minimisation for the collection. What follows from this, above all, is that the standards applying to climate requirements usually have to be re-evaluated and refined – including in the light of new research findings.

Sustainability in conservation and restoration

Sustainability in conservation and restoration involves in particular the use of risk forecasting, preventive conservation and a conscious selection of

materials and products for use in conservation and restoration practice (Di Turo and Medeghini 2021, 3619). The following recommendations are largely based on de Silva and Henderson (2011).

Materials and substances used in conservation and restoration can impact on the environment during their production, use and disposal. Activities involving potentially problematic substances include stripping, cleaning and drying, removal of toxic contaminants, corrosion protection and storage (de Silva and Henderson 2011, 7). Environmentally friendly procurement, use and disposal are therefore at the heart of sustainable restoration practice. It is important in this context to establish close cooperation with those responsible for procurement and waste management.

Good practice

Indigenous methods for wood preservation

Botswana National Museum

The Botswana National Museum conserves wooden artefacts ranging from mortars, pestles and drums its climate-controlled storerooms. Among these artefacts are wooden kitchen utensils such as steering spoons and bowls, used by the Batswana people to prepare food. Wooden drums and sticks are traditional musical instruments, which are sacred objects used during ritual performances and traditional festivals.

Indigenous groups in Botswana have traditional conservation methods, especially for the preservation of wooden objects. This indigenous knowledge is used by the National Museum to prevent insect infestation of its wooden collections. Leshaba treatment is one of the main indigenous ways of preserving wood. Leshaba is a natural type of soil. It is smooth in texture and is white in colour. Potters use it to make decorative patterns on clay pots. Indigenous architects paint motifs on mud huts using Leshaba as a colorant. Batswana generally apply Leshaba on wooden objects to prolong their live span. Preservation practice in the Botswana National Museum comprises smearing Leshaba on wooden collections. The treatment seals off cracks on artefacts. Closing up openings on the wooden objects makes it impossible for insects like termites and mould to penetrate wooden artefacts. This method allows for the preservation of wooden objects without altering their biological or chemical composition. When artefacts are used for display or study purposes, Leshaba is rubbed off with a soft cloth.

Leshaba is also used to treat fungi-affected wooden artefacts. Therefore, a mixture is applied on the infested wooden object so as to reach insect habitation inside the object. The soil blocks all air openings and seals off any habitation of insects within the object, due to the fine particles of the soil mixture. As a result, insects within the wooden

object die off within a time period of two to three weeks. Afterwards, a soft fabric is used to wipe off Leshaba from the treated object. Wooden objects treated with Leshaba undergo no internal structure or chemical changes and retain their original colour. This indigenous technique ensures safeguarding artefacts without posing any harm to the health of conservators or the environment.

This environmentally friendly method demonstrates the relevance of indigenous knowledge in sustainable conservation of museum collections.

Contributed by
Goabaone Montsho

The main starting point for the ecologically sustainable use of such substances is compliance with relevant regulations. This includes organisational, national and international regulations, for example on the use of hazardous substances. Proactive changes in practices and materials used constitute an additional step towards sustainability. For example, potentially harmful products and substances can be identified before they are banned and replaced by environmentally friendly alternatives (de Silva and Henderson 2011, 8).

When selecting materials for treatments, conservators should question the necessity for their use based on current research and use alternatives to hazardous products whenever possible. In general, the aim should be to use non-toxic and biodegradable substances for the cleaning and conservation of collection objects. Ideally, the selection of products should be based on life cycle analyses, or at least on environmental impact assessments (Di Turo and Medeghini 2021, 3619). A database of relevant factors for conservation work as well as information on environmental compatibility and the findings from life cycle analyses can support this approach. However, it will take time before alternative materials are available for some of the substances that play a fundamental role in conservation practice today (de Silva and Henderson 2011, 10–11). Until then, conservators can minimise the application of these substances through improved estimation of necessary quantities and targeted usage. Overall, continuous reflection on one's own working practice can not only improve the efficiency of conservation measures, but at the same time reduce the unnecessary use of environmentally harmful substances (de Silva and Henderson 2011, 12).

As in other areas, waste management in the field of conservation and restoration should be guided by the principle of the 3 Rs: reduce, reuse and recycle. As a first step, a waste audit is helpful, which ideally should be linked to the waste management policy for the whole institution (see Chapter 6.3). However, because of the potentially harmful substances used in conservation practice, a specific waste audit for the conservation laboratory is also useful,

even if there is no overarching process in place for the museum as a whole. As a general rule, potentially harmful waste materials should be disposed of in accordance with guidelines. Whenever possible, the local recycling infrastructure should be used (de Silva and Henderson 2011, 8–9). The possibility of environmentally harmful substances entering the soil and groundwater as a result of conservation activities should be minimised. In addition to general precautions to prevent this in everyday work, an emergency plan should also be in place to provide measures to prevent entry into the environment in the event of an accidental release (de Silva and Henderson 2011, 12).

Toolbox

Sustainable practice | Collection and conservation

1 Develop a degrowth strategy and simpler guidelines for deaccession.
2 Check the fluctuation ranges for the air-conditioning technology and introduce flexible room climate regimes.
3 Communicate the acquisition background of collection objects proactively and make it accessible to stakeholders.
4 Strengthen partnerships with communities of origin and organisations in the Global South.
5 Reduce the use of toxic materials and solvents and/or replace them with alternatives.

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8 Transdisciplinary research and sustainability science in museums

In addition to their public function, many museums are also important natural or cultural history research facilities. Their collections represent an invaluable resource for numerous scientific disciplines. How can research at museums address the fundamental questions of sustainability? What role do they play in a society that is increasingly shaped by science? In this environment, museums act more than ever at the interface of science and society, promoting an open, participatory and democratic culture of science.

	Vision
Identity	Meeting place and discourse venue for science and society
Expertise	Museal transdisciplinary understanding of research, epistemological science communication, cutting-edge digital competence
Practice	Making research an open, collaborative and participatory activity

8.1 Sustainability as a scientific field and transdisciplinary research

The development of an independent science of sustainability is based on the assumption that sustainability can only be realised if it is founded on scientific knowledge (de Vries 2017, 4). Sustainability science emerged as a research agenda at the end of the 1980s and has developed very rapidly since then. Initially, the focus was on environmental issues, particularly as they applied to global systems, and this shaped the scientific discourse on sustainability in the direction of global ecosystem research (de Vries 2017, 4). In the beginning, engineering disciplines were dominant and primarily addressed the management of ecological systems.

The recognition that sustainability and the challenges of sustainable development are not purely scientific or ecological problems, but that the interaction between nature and society is central, forms the starting point for questions of sustainability science. This social-ecological perspective on the issues of sustainable development is thus characteristic of the approach of sustainability science. It addresses problems of sustainable development and deals with them primarily on the basis of theories and models that describe

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the interrelationships between natural and social systems. In addition, sustainability science also includes an applied perspective wherein practical measures are developed as a response to problems of sustainability (Kates 2016, 1). The impacts and risks of global crises such as climate change and migration are particularly apparent in some regions. These spatial manifestations are related to local social and ecological features. Sustainability science is therefore always related to a specific place and operates at the regional level, or relates that level to global systems and processes (Kates et al. 2001, 641). Sustainability science can be summarised as (i) the study of social-ecological systems with a focus on (ii) interactions between natural systems and social systems, using (iii) transdisciplinary, integrative research approaches to answer (iv) problem-driven questions (de Vries 2017, 5). Sustainability science deals with socially relevant problems with reference to the guiding principle of sustainability. In this way, it differs from a classical scientific approach, which takes value freedom as the starting point for all scientific activity (Evans and Achiam 2021, 1197).

Social cohesion through transdisciplinary science

The following considerations on using the transdisciplinarity approach for museum research are based on Jahn (2008). It is characteristic of the wicked problems outlined in Chapter 2.1 that they combine causes and effects on social, spatial and temporal levels: local and global aspects intertwine, and long-time horizons influence current issues (Jahn 2008, 25).

Sustainable development thus concerns different spatial and temporal spectrums, which makes it more difficult for traditional science, organised along disciplinary lines and based on a division of labour, to deal with. "This requires a new approach and new forms of knowledge production that adequately address the structure of these complex social problems" (Jahn 2008, 25). This change poses a challenge for science communication in particular, as until now large sections of society have expected science to provide clear and incontrovertible facts to underpin decision-making processes. The fact that scientific findings are becoming increasingly uncertain leads to a fundamental scepticism towards the scientific methodology that, however, remains necessary to support decisions on a global, societal and individual level (Jahn 2008, 26).

According to Jahn (2008), this is precisely where transdisciplinary research comes in: it involves social actors in the process of generating scientific knowledge. Transdisciplinarity is an integrative research approach. In a dialogue between scientific and non-scientific actors, problematic areas are sharpened into research questions that can be investigated (Jahn 2008, 27). In transdisciplinary research, researchers from different disciplines work together to find new solutions to a problem. This often involves a focus on problems of everyday life. It ensures that people from different backgrounds can come to a better understanding of each other. Transdisciplinary research connects people and organisations with different interests and enables them

to work together. One outcome is the linking together of different bodies of knowledge and, in particular, the possibility of linking experiential and traditional knowledge (Bergmann et al. 2010, 41–43). This function illustrates how transdisciplinary science has a powerful impact beyond the scientific community in the wider society, where it contributes to mutual understanding and cultural cohesion.

Transdisciplinary research in museums

Research in the sustainable museum identifies interfaces and productive connections between sustainability science and research related to collections. While these links are particularly apparent in natural history museums, a broader understanding of sustainability is helpful in uncovering points of contact and opportunities for other types of museums as well.

If lifeworld problems serve as starting points for research questions, actors from the world of social practice must be included in any transdisciplinary research project (Bergmann et al. 2012, 36). In such constellations, museums can be involved as partners from the world of practice in transdisciplinary research projects and can themselves involve other stakeholders such as visitors. In order for transdisciplinarity to contribute to sustainable development, it must be embedded in a broad social debate on the role of science and the ways in which it can help to solve global challenges (Hirsch Hadorn et al. 2008, 441). Museums can be particularly important actors in such research collaborations, as they provide ideal locations for this kind of societal discourse, and can thus serve as a hinge between research and wider society. In this role, museums can contribute in a unique way to a participatory science society (see Figure 8.1).

Integration methods and tools are also used in transdisciplinary research practice. These methods include, among others, theoretical framing and integration through artefacts and products (Bergmann et al. 2012, 50). In the context of transdisciplinary research in and with museums, the integration of artefacts as so-called boundary objects is particularly useful. A boundary object "marks those interfaces at which actors from the spheres of science, politics or business can interact, orientate themselves, and reach an understanding without first having to perform elaborate translations and transformations of terms, theories, and methods" (Bergmann et al. 2010, 106). Collection objects in museums are thus in fact exemplary boundary objects, as their plasticity and vivid representationality makes them ideal for transdisciplinary research processes as a "materialised crystallisation point" (Bergmann et al. 2010, 108). This is not just about different perspectives on and information about the boundary objects (Star and Griesemer 1989, 414), but about their material quality as a starting point for problem solving. Because they are physical items, collection objects offer genuine possibilities for an application to practice. Objects can therefore serve as an interface for integrating both application-related questions and project partners from the world of science (Bergmann et al. 2012, 108).

In addition, the use of artistic and sensory methods in research processes has the potential not only to develop other ways of gaining knowledge, but also to

enrich knowledge transfer in the field of sustainability science. Such artistic research enables new forms of knowledge production, particularly for something as complex as sustainability science (Heinrichs 2018, 132). There are numerous overlaps with co-design, co-production and co-dissemination (Pettibone et al. 2018, 222). In museums, these methods also include co-curation.

The perspective of transdisciplinarity also offers opportunities for registrars and for working with collections. The organisation of collections is often characterised by formalised and closed categorisations. According to Cameron and Mengler, such rigid formalisations also affect the acquisition of new objects and information storage as well as exhibition work. In contrast, the digitalisation of collections expands the cultural frame of reference and brings with it new requirements for mapping this complexity (Cameron and Mengler 2009, 190–191). Transdisciplinary collection management can expand the meaning of objects beyond disciplinary boundaries. It can serve to make the boundaries of classification and contextualisation more permeable (Cameron and Mengler 2009, 213–214). Transdisciplinary approaches to museum collections can be used to reinterpret the relationships between and the organisation of collection objects. This can provide fresh ideas not only for collection management but also for the interpretation of objects and curatorial work (Cameron and Mengler 2009, 189).

Transdisciplinarity as a means to achieving local embeddedness

In order to solve complex social-ecological problems at the local level, a joint learning process among a wide range of actors is necessary. Such networks can also be understood as communities of practice. Museums can contribute to a so-called transdisciplinary community of practice through transdisciplinary cooperation at the local level (Cundill et al. 2015, 1–2). However, successful local cooperation is contingent on a number of factors and requires specific approaches. In order to enable interested parties to enter the participatory process in the context of sustainability research, it is important that there are easy-to-access opportunities for observation by so-called intellectual neighbours for visitors who are not involved in a project. This enables outside actors to perceive, question and disseminate the knowledge generated by the project. In addition, working with typical local boundary objects makes it easier for different actors to identify with the project. Local embeddedness can also be increased by sensitively and strategically addressing and challenging the asymmetric power structures between experts and lay people (Cundill et al. 2015, 3–4).

8.2 From the "public understanding of research" to the communication of epistemological practices

Scientific findings and the results of research projects are becoming increasingly important for the governance of society. Examples of this are the interpretation of data during the Covid pandemic and the discussion around climate modelling and climate change. For social discourse as a whole and for

each individual, it will be necessary in future for people not only to understand scientific results, but also to be able to understand and reflect on the process of research itself. This ability to reflect will become increasingly important in enabling participation in the shaping of society as an informed and engaged citizen.

In future, science communication will therefore focus less on communicating scientific findings and topics and much more on communicating the research process itself. This approach to science communication is more about a "public understanding of research" than a "public understanding of science" (Powell and Field 2001). Seen in this light, the educational mission of museums is not primarily to impart knowledge, but to increase the understanding of the process of gaining knowledge.

Public understanding of research focuses on research as a process. This means that errors, wrong turns and divergent interpretations are also highlighted. Similarly, the normative foundations of research are made transparent and the ethical and social implications are discussed. The possible applications and implications of scientific findings are also addressed (Powell and Field 2001, 423–424). In order to communicate the process of research in a comprehensible way, the first step is an introduction to scientific work, or the so-called scientific method (see Gower 2002). This involves reflecting on how the effects of errors, individual perspectives, social interactions, biases and prejudices can be eliminated. Addressing the problems and challenges that arise for researchers and showing how these are dealt with in the research process contributes to a critical understanding. Another important factor in understanding the scientific way of working is the development and application of methods and instruments. This makes the process of knowledge generation comprehensible and tangible.

New social spaces are needed for this kind of communication about how insights and knowledge emerge, because this discourse needs to be given a space, it needs to be moderated and managed (Durant 2004, 59). For this purpose, a radical opening up of research institutions to the public is urgently needed. With their explicit focus on the public, museums – much more so than universities and colleges, non-university research institutions or laboratories – appear to be the institutions best suited to manage this process. Museums are the ideal location for research to be opened up for lay people, for the promotion of Citizen Science and for contributing to a public understanding of research in general.

The philosophy of science as a basis for the mediation of knowledge

In order to understand and classify transdisciplinary and sustainability science, it is also necessary to acquire a basic understanding of theoretical considerations on the nature and evaluation of knowledge. A brief look at the history of science can serve as a relatively accessible and easy introduction to this. It can be especially interesting to examine historically whether and to what extent knowledge that is considered certain, i.e. true, has changed over time. The mutability of the so-called scientific paradigms (Kuhn 1996) is today a commonplace of the history of science. Kuhn thereby questions above all the concept of universally valid knowledge. This insight leads

science communication from a science-historical perspective to a fundamental reflection on the question of what knowledge is, how it relates to reality, how science works and what kind of statements its methods can generate.

In order to integrate these questions into the educational work of (natural) science museums in particular, it is helpful to fall back on the elementary concepts of the philosophy of science. The philosophy of science analyses the methods of scientific investigation and challenges the underlying assumptions. While theories are often understood as true representations of reality, they can also be taken merely as a basis from which to predict observations in the future. According to this interpretation, knowledge is not an absolute representation of reality. Rather, it can be understood as knowledge in the engineering sense, knowledge which enables correct predictions without having to be true in itself (Rosenberg and McIntyre 2020, 10).

A further inference to be drawn from Kuhn (1996) is that natural science, too, is not practised in isolation from social influences, and that these in fact have a greater bearing on the outcomes of scientific activity than purely methodological or disciplinary considerations. Science can therefore only be understood and communicated if it is interpreted as a social practice (Rosenberg and McIntyre 2020, 254). An important consideration in this context is the question of the role of values in science. It can be argued that natural science in particular is concerned with facts and thus produces knowledge in an objective way. According to this line of argument, values and ethical considerations affect only the application of scientific findings. In this understanding, science itself is a value-free process. The opposing argument is that scientists, as human beings, always bring values into the research process. For instance, values influence the selection of research topics and questions, the choice and development of theories to explain observations and data sets, and the evaluation of the significance of potential applications, which are often at least implicitly considered by scientists (Okasha 2016, 123). For sustainability science and transdisciplinary research in particular, the contingency of science on the interplay between social factors and the scientific method plays a crucial role (Lewenstein and Bonney 2004, 63). The emergence of knowledge through a collaborative process applies, on the one hand, to the role of scientific peer groups, which represent an important mechanism for quality assurance within the knowledge process. But it also applies to the integration of researchers into society as a whole and society's expectations, as well as the dependencies that go hand in hand with this.

A place for critical reflection on the history of science

According to Schwan (2014), the history of the development of museums means that they are often based on the ideals of the Enlightenment and an empiricist understanding of science. The history of science is not infrequently presented as the discovery of given natural facts. Behind this, at least implicitly, lies a conception of (natural) science that produces correct, indisputable, true and unambiguous findings and theories. It is precisely this view that contributes to the socially dominant but problematic understanding that science

produces true and certain knowledge. But in particular the global crises such as Covid and climate change have made it clear that the uncertainty of evidence and the need for revision are a central element of the scientific method (Schwan et al. 2014, 72).

Against this background, science communication in museums could emphasise more strongly than before the uncertainty and social contingency of knowledge – including on issues in the natural sciences. Such a stance, together with a deliberate engagement with epistemological principles, can be the starting point for educational work in museums.

Particularly in the practical application of sustainability science, greater transparency and openness about the contingency of the research process would seem to make sense. This is because the problem-driven approach of sustainability science presupposes normative foundations and thus leads directly to epistemological questions about the general validity or contingency of scientific findings.

This new approach to science communication in museums also leads to a dilemma: the focus on the theory and philosophy of science increasingly places processes and human activities at the centre – whereas in museums the focus is rather on objects and the materiality of knowledge. Museums are faced with the challenge of finding new ways to adapt their competences to this situation (Lewenstein and Bonney 2004, 65).

Epistemology as a visitor experience

The understanding of science outlined here can be particularly effective for curatorial and pedagogical work in museums. What is meant by this is that perspectives derived from the history of science, the theory of science and the philosophy of science become increasingly important in museum work as a whole. In future, the subject matter and theme of museums and their exhibitions will thus always be in part the production of knowledge. Collecting objects and incorporating them into museums is an epistemological process in its own right, because the objects are placed in a new context that can generate new knowledge. This method of acquiring knowledge, which is peculiar to museums, can be a good starting point for exploring scientific and epistemological processes. Such self-directed reflection leads the visitor from the immediate experience of the visit itself to contemplation on a meta-level (Te Heesen 2010, 217). Such meta-perspectives on knowledge and the institution of the museum make visitors aware of the fact that collecting, research and the dissemination of knowledge are embedded in specific framework conditions that differ greatly depending on place and time and thus shape both the work and its outcomes. Different aspects play a role in conveying such a meta-perspective on science in the museum. One is the presentation of the mutability of knowledge, especially through the history of science and the focus on cooperation processes and power imbalances in the scientific community. At the same time, the divergent perspectives of different scientific disciplines play a key role. Museums can present and discuss uncertain and ambiguous evidence in this context to an even greater extent than before – and thus provide an

insight into the research process itself. There can be uncertainties and contradictions of this kind between different explanatory models or theories, between a theoretical prediction and observed data, or between different interpretations of data and results (Schwan et al. 2014, 72).

A museum that focuses on the production of knowledge itself is only credible if it takes the same approach towards itself. This means that the internal processes of museum work, of collecting and preserving and of presenting and disseminating knowledge are made transparent. In this way, the museum, as a place of knowledge generation and dissemination, can itself become a discursive object. The great challenge here is to simplify these facts and processes of reflection in such a way that they are accessible for the work of the museum and to visitors. This can often happen even without direct mention of such terms or of the philosophical and scientific-historical discourses, positions and events; rather, the understanding of science that goes with them can implicitly shape the work of the museum and be part of the mediation activities.

What makes museums so clearly suitable for this process of gaining knowledge is their object-focused work. It is precisely the contextualisation and interpretation of objects that provides an opportunity to point to these fundamental questions and positions. Another characteristic aspect is the question of the significance of materiality for knowledge acquisition. With their focus on the materiality of knowledge, museums can become research institutions equipped with unique prerequisites for conducting research in the philosophy of science based on collections.

Visitors can best learn and reflect on these fundamental questions concerning the research process and the understanding of methods and tools in the course of the process itself, i.e. by doing. An action-oriented approach then leads to public participation in scientific research, or participatory science. Initiatives in this area are often grouped under the broad heading of Citizen Science (Strasser et al. 2019, 55).

Toolbox

Method | Supporting internal reflection

The participation process within sustainability management is characterised by a discourse on, and a reorientation of, the values underlying the work in the museum. In smaller groups, laddering is a suitable method for this. Laddering enables reflection on behavioural patterns through illuminating the needs and belief systems that underlie behaviour. Laddering is a method in which, in an interview situation, either in a larger group or in groups of two, the answers given by one's interlocutor are immediately returned as questions – thus creating a ladder of reflection leading to deeper-lying beliefs and values. This process of insight can in itself be helpful in changing behavioural patterns. And it always provides a starting point for the development of alternative actions and processes (Bourne and Jenkins 2005, 415–416).

8.3 Citizen Science and open research labs

Citizen Science can be understood as a form of public participation in science. It is generally understood to include making science accessible and useful to citizens (Irwin 1995, xi). But Citizen Science can also be understood as a research process carried out by lay people themselves. Citizen Science contributes to promoting democracy, building social capital, increasing scientific literacy, focusing research on local problems and saving time and money, especially for public administration (Conrad and Hilchey 2011, 283). In the design of Citizen Science projects, a balance is usually struck between scientific, political and educational goals (Pettibone et al. 2018, 223). One challenge posed by Citizen Science is the assumption of responsibility for the research process. While this traditionally lies with research institutions, in the context of Citizen Science individuals take on this responsibility, ideally under the supervision of civil society (Finke 2014, 111). The uncertainties in the demarcation to how transdisciplinarity is understood and in the respective role of laypersons in the research process already become apparent here. Transdisciplinary research and Citizen Science both have a normative core: both approaches are instruments of a political programme intended to contribute to social transformation (see Pettibone et al. 2018, 224).

Citizen Science also enables very specific practices of knowledge acquisition. These include collection, calculation, analysis and production in the sense of co-production and Maker Culture. However, the different practices often have different meanings depending on the discipline involved. While collection plays a role in, for example, biological projects outside the museum, analysis is an important approach for digital collections (Strasser et al. 2019, 55).

Community-based science, strengthened by Citizen Science, has a key role to play in initiating the Great Transformation that is required to address our global challenges (Finke 2014, 204–205). Citizen Science can lead to sustainability-oriented attitudes and behaviours being spread through different parts of the population (Ballard et al. 2017, 96). At the local level, Citizen Science also contributes to the resilience of communities and the development of local sustainable lifestyles (Ballard et al. 2017, 89).

Museums as the nucleus of sustainable Citizen Science

The specific potential of museums for Citizen Science approaches has not yet been sufficiently analysed or theoretically explored (Hecker et al. 2018, 8). Yet museums are ideal places for the practice of Citizen Science, because they are prominent sites of public discourse where lay people and scientists interact. Museums can play a pioneering role in Citizen Science by involving relevant stakeholders in scientific research projects (Garthe and Peter 2014, 16). Citizen Science can only fulfil the promise of broad public participation to a

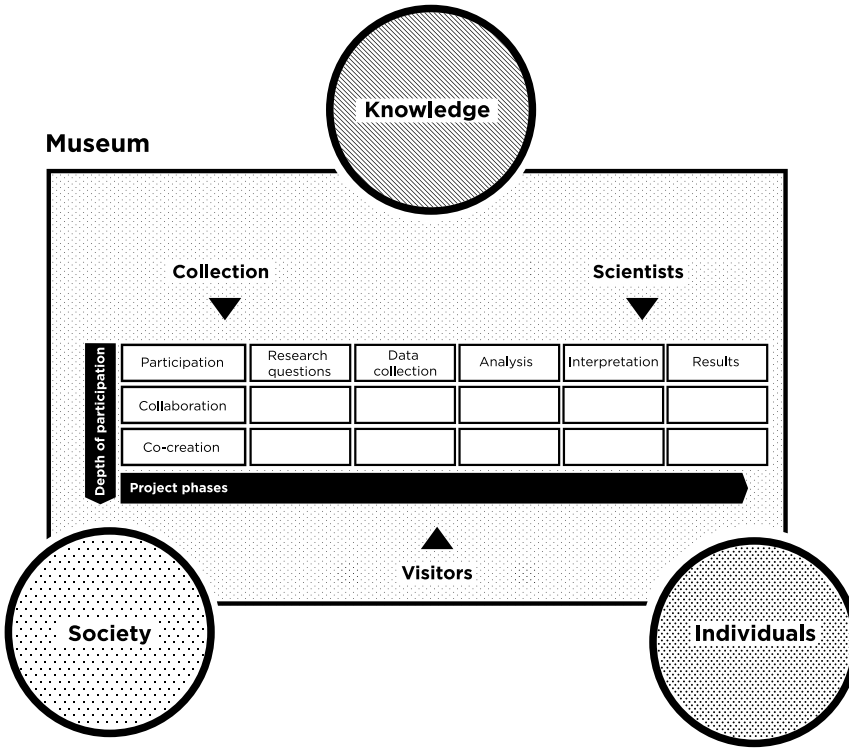

Figure 8.1 Participation and Citizen Science in the sustainable museum.

limited extent, as studies show that participants in Citizen Science projects come from a stratum that already has an affinity for science (Strasser et al. 2019, 62). Small and medium-sized museums can play a key role here, as they are widely spread out through the country, have good local networks and present low entry barriers for potentially interested visitors (Finke 2014, 168). A broad interpretation of Citizen Science would see museums relinquishing some of their interpretive authority and thus anchoring themselves more firmly in a civil society characterised by a democratic approach to knowledge. This can also be strengthened through interactive public consultation processes (Einsiedel and Einsiedel 2004, 73). Museums can adopt such deliberative models for engaging the public in research questions, thereby providing a new public-facing service.

Citizen Science projects at museums can contribute indirectly and directly to greater sustainability. Indirect effects include education, raising awareness and the resulting changes in attitudes and behaviour. Direct effects include, for example, providing information to support decision-making processes or making a positive contribution to governance mechanisms (Ballard et al. 2017, 88). Museums can enhance the social-ecological effects of Citizen

Science by accessing new audiences, mobilising volunteers and driving forward research focusing on local issues (Ballard et al. 2017, 87).

The implementation in the museum can take place in many ways – as a project in the museum itself, as an activity, perhaps as part of a cooperation outside the museum, or as a purely digital activity. A Citizen Science approach has also been used by museums in projects aiming at crowdsourcing or monitoring outside the museum. Within the museum, the public can be involved in data analysis, the analysis of samples and photos, or the creation of graphs and tables. Citizen Science projects are suitable for data processing, especially for digitised collections (Ballard et al. 2017, 91). Web portals or smartphone apps can function as digital approaches with which volunteers can collect, produce and enter data regardless of location. However, the integration of Citizen Science approaches into regular research projects also involves making museums dependent on them. The work of the scientists at the museum may then be dependent on data collection or other activities carried out by the citizen scientists.

The enormous opportunity offered by transdisciplinary research and Citizen Science in museums is to make the activities and the available data part of the visitor experience in exhibitions. For this, it is important to develop ways in which this data can be used to enrich objects, interactive exhibits and entire room situations. Citizen Science projects for data processing are particularly suitable for digitised collections (Ballard et al. 2017, 91). As a digital layer, data can not only allow new contextualisations, but also enable tailor-made content and thus experiences.

However, Citizen Science projects in museums by no means always contribute to sustainable development. Whether such an outcome is achieved depends on a variety of factors. The following aspects should be considered when seeking to create successful and effective museum projects (Ballard et al. 2017, 93–94):

- a long-term commitment on the part of volunteers,
- cooperation with local government, which leads to the findings being used and measures being derived from them,
- designing programmes that aim to have an impact and that include evaluation,
- cooperation between different museum departments,
- cooperation between different museums or other relevant institutions.

In order to enhance the contribution to local sustainability, the data generated can be used in decision-making processes by policymakers and local authorities (Conrad and Hilchey 2011, 281). Overall, Citizen Science can only achieve its full impact if, under the aegis of a participatory science society (vgl. Kap.3.4), it significantly lowers the barriers to participation for broad target groups or for society as a whole.

Good practice

Throwing shade on climate change with community science

Science Museum of Virginia, USA

Science and technology centres across the United States continue to emerge as community hubs for not only learning about the principles of climate science and developing climate science literacy, but also the growing need to build climate change resiliency into their communities. What's less clear, however, is how these institutions actually encourage and move individuals from awareness of climate change issues to sustained climate action based on this acquired literacy at the local scale.

The Science Museum of Virginia developed, delivered and had external evaluation performed on climate science and resiliency-themed programming over a three-year period, connecting with its all-ages audiences. These programs spanned audio and visual media, passive Planetarium shows, facilitated experiences on an interactive media globe, collaborative role play experiences about extreme weather hazard management, as well as hands-on project-based learning.

The museum's most successful programme grew out of leading a small-scale community-based participatory climate science research campaign. The campaign aimed at measuring the City of Richmond's urban heat island effect, or the physical amplification of air temperatures in response to underlying land use and land cover patterns within a city's geography. Volunteers secured air temperature thermometers to vehicles and bicycles, traversing co-created routes around the City during a heat wave event. Community scientists uncovered an ~16-degree Fahrenheit difference between the warmest and coolest place in the City at the same time. This campaign as well as accompanying visualisations of the data improved audience climate science literacy and recall of adaptation and resilience solutions like planting trees, installing green infrastructure, and creating new greenspaces. "Throwing Shade on Climate Change", a spinoff 6-week education programme centring these data developed in partnership with Groundwork RVA, a teen-focused educational non-profit, engaged 14 young people in exploring the urban heat island data as well as its environmental justice context. Participants used the data to explore the heat hazard, prioritise solutions and implement a small-scale tree planting project at their local school. Since then, dozens of these campaigns have occurred across the country, garnering attention from national and local news outlets and spurring community engagement around urban heat and other related hazards. By adopting this approach other institutions can inspire similar adaptation and resilience action-oriented programs in urban areas around the world.

Contributed by
Jeremy S. Hoffman

Digitised collections and Big Open Data

Potential solutions to the global challenges draw on extensive data sets generated by theory-based research with location-specific, long time series. In particular, research into dynamic natural systems leads to large quantities of data. Handling large quantities of data (Big Data) will therefore become a key building block for sustainable development in the future. By linking these issues with the concept of Citizen Science and the collection of large quantities of data by citizen scientists, Big Data will play an even greater role in the future.

For museums, the combination of Citizen Science and Big Data holds considerable development potential, especially with regard to digitised collections. Collection-specific data can be utilised for current research questions through the contribution of site-specific and historical data supplemented by current surveys outside the museum (Spear et al. 2017, 1). Another opportunity presented by Citizen Science is that it can generate data for issues and areas that are generally under-researched (Ballard et al. 2017, 89). In this way, new areas of knowledge can be opened up with regard to the collection and questions can be pursued independently of external funding requirements. Citizen Science can thus contribute to focusing on the importance of collections for questions of sustainability and to making the public more aware of them. The prerequisite for this is a fundamental openness to the latest digital developments and technologies and their evaluation in terms of their applicability and significance for the museum's work (Gries 2019, 102).

Digitised collection data and Citizen Science also demonstrate the importance of Open Access, or an Open Data approach, for museums. Making data available to all citizens should be a matter of course and is the basic prerequisite for high visibility and effectiveness among all interested social groups. The potential that the Open Data approach offers to museums, for example in the context of hackathons, has been illustrated in numerous projects. The use of the Open Data or Open Science approach to collections has also led to efforts to make digitised samples freely accessible within the framework of the Open Specimen Movement (Colella et al. 2021, 405). This encourages museums to preserve specimens as raw scientific data and to make them accessible (Schilthuizen et al. 2015, 237).

An important future opportunity for Big Data in museums lies in the possibility of connecting the data stocks of museums with each other. This could enable new portals and infrastructures to be built that open up entirely new possibilities for analysis and application (Kitchin 2014, 62). Digitised objects should therefore be seen less as isolated collections and more as an important building block in open and interdisciplinary networks for generating information and data. This means they produce content-based relationships and metadata that contribute to a digital-global store of knowledge and make possible a semantic web (Cameron and Robinson 2007, 186).

One of the main problems of Citizen Science, that of data quality, can be addressed precisely through collaboration with Big Data. While calibration

and validation have been the main methods for enhancing data quality up to now, advances in the use of big data will make it increasingly easier to compensate for lower data quality in the future (Ballard et al. 2017, 89). At the same time, advancing digitalisation also entails trade-offs with regard to sustainability. Digital museums and collections consume more energy and thus contribute to climate change. Approaches to sustainable digitalisation in other sectors – such as the use of ecologically optimised data centres – still need to be adapted to the specific requirements of museums.

Open research labs in museums

Museums are an ideal place for non-scientists and scientists to meet. In a direct dialogue between scientists and visitors, they can reflect on the social conditions under which research is conducted and its impact on the environment and society. This goal can be achieved by setting up open research labs, where scientists conduct genuine research in a museum environment while interacting with visitors (Garthe 2018). There are numerous open research labs at art museums and in conservation science (see Watts et al. 2008).

Unlike school or visitor laboratories, no experiments or activities designed for communication purposes are carried out in open research labs. In an open research lab, actual research takes place that is determined only by the research questions of the scientists. The authenticity of the research conducted in the laboratory should therefore always be guaranteed. The design of open research labs should allow for interaction on an equal footing and should not promote an atmosphere in which visitors merely observe the scientists from a distance (Hix et al. 2012, 135).

There are a number of advantages associated with the establishment of open research labs, and they have been evaluated and analysed using the example of the Open Nanotechnology Lab in Munich (Hix et al. 2012; Hix and Heckl 2011). The opportunity to observe experiments in progress or ask questions in this direct dialogue can awaken interest in the research activity. Exhibition themes can also be deepened and reflected upon in this authentic situation. There are also advantages for scientists. Through interaction with visitors, they gain insight into the social and cultural contexts that determine the perception of their respective field of research. These experiences enable scientists to better understand the public reaction to and discussion of their research field (Hix et al. 2012, 137). An open research lab can thus promote "scientists' understanding of the public" (Mooney 2010, 10). In this way, working in an open research lab contributes greatly to reflection on the process of research in general and on one's own field of research in detail. Scientists who have worked in an open research lab are thus well prepared for discussion of the opportunities and risks of their research in a broad societal context.

Working in an open research lab certainly entails challenges for the scientists working there, because scientific productivity can decline due to the intense communication with visitors (Hix and Heckl 2011, 381).

In summary, open research labs can be a key facility for future transdisciplinary research efforts and a fundamental element of science communication at any museum.

Toolbox

Sustainable practice | Research and science

1 Create a transdisciplinary and problem-oriented understanding of research in the museum.
2 Build partnerships with sustainability science institutions.
3 Institute a rigorously enforced policy for public accessibility of information and data.
4 Involve citizen scientists in research at the museum.
5 Identify interested scientists and set up an open research lab.

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9 Collaborative curation and sustainable exhibitions

Exhibitions are a unique instrument for raising awareness of sustainability among museum audiences and inspiring them. Conversely, can exhibitions and curation also benefit from sustainability communication? How exactly do exhibitions communicate sustainability, either directly through the object itself or through the experience of the space? In addition to sustainability as a thematic frame of reference, the focus here is also on questions regarding environmentally compatible production and the lending of collection objects.

	Vision
Identity	Object-based experience and learning format with unique potential for the Great Transformation
Expertise	Psychologically based sustainability communication, transformative design, circular economy and sharing
Practice	Developing and implementing programmes based on their societal impact

9.1 Sustainable programming and thematic framing

Anchoring sustainability in the museum as a response to global challenges means taking the topic into account in all programme activities. The development of a sustainable programme of this kind requires a framework of shared values supported by the entire museum, on the basis of which services and activities are developed. The programme integrates the different dimensions of and perspectives on sustainability (see Des Griffin and Abraham 2000, 351). This means that challenges, problems and content-related references to sustainability can be more strongly reflected in exhibitions. Two approaches can be used to address sustainability as an exhibition theme. Firstly, the relevance of the exhibition theme for sustainable development can be identified as part of each exhibition. Links to sustainability can be demonstrated in the subject area of the exhibition. This means, for example, taking a look at human-environment relations within the exhibition's themes and objects. If this is difficult to convey through objects or within the parameters of the exhibition itself, these perspectives could at least be integrated into accompanying

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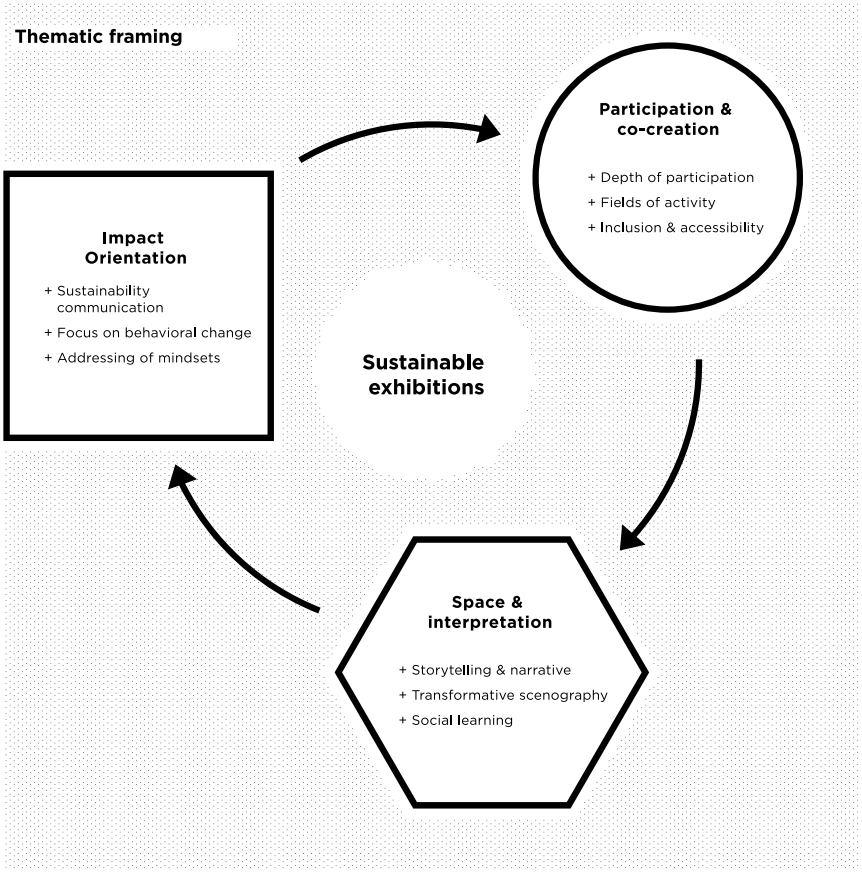

Figure 9.1 Sustainable programming and exhibiting.

events and programmes. Secondly, from time to time an exhibition can be presented that is highly relevant to the topic of sustainable development. The focus on sustainability will then present many opportunities: sustainability enables new perspectives and thus innovative exhibitions because it takes a systemic view of issues (see Figure 9.1).

Sustainable programming also focuses in particular on children and young people as a target group, as they are the ones who are significantly affected by, and will shape, the global future.

Sustainable curating and exhibitions also mean increasing transparency with regard to the origin and context of curatorial work. The sources and truthfulness of media information are already being questioned by many people as a matter of course, and sometimes also challenged. Exhibitions as a form of communication can take up visitors' requirements and expectations more strongly by proactively communicating curatorial strategies, sources and decisions in the production process in a transparent manner and making them accessible to visitors (Cameron 2005, 230).

It is precisely this new type of programming that should be assessed in terms of its impact (see Nelson and Cohn 2015, 34). This is how sustainable programming can be further developed and articulated as a viable approach for the future.

Demonstrating the links to sustainability

Because of the fundamental ethical basis underlying the guiding principle of sustainability, and because of its comprehensive applicability to social-ecological systems, links to sustainability issues can be identified in the vast majority of exhibitions. This applies regardless of the genre of the museum. The starting point for this is to use sustainability holistically to provide a thematic framework for the practice of curating and exhibiting. The associations, narratives and links between the subject matter of the exhibition and sustainable development that are thereby revealed can then become more central to the exhibition or can be elaborated and deepened in the accompanying programme.

This also brings sustainable development out of its ecological niche and enables it to connect with broad fields within the museum sector. This approach is particularly important, as it contributes to a holistic understanding of sustainability and also helps it seep through into museum genres that are more remote in terms of content. An example of this would be an exhibition in an art museum on landscape painting created during the Little Ice Age of the 19th century – an ideal starting point for reflecting on anthropogenic climate change (see Ossing 2012).

The fruitful intersection between art and sustainability can make art museums role models to demonstrate how this framing can be translated into programming and exhibitions in an authentic and inspiring way. For example, artworks that use forms of social practice can in ideal cases create uncomfortable, subversive and enabling situations for new experiences. The associated unsettling experiences make it easier for the recipients to reflect on conventions, habitual practices, attitudes and values and to change them in the direction of sustainability (Lineberry and Wiek 2016, 316). A sustainable aesthetic that perceives and values complexity can also enrich a discourse on sustainability in art museums (Kagan 2012, 34).

Exhibitions on core challenges of social transformation

In addition to the thematical framing of exhibitions that have a different focus, exhibitions can also directly address specific issues of societal transformation and sustainability. Different museum genres can operate within their area of competence as usual, without necessarily having to draw on or communicate scientific findings.

In exhibitions of this kind, sustainability science can serve both to provide the content and as the frame of reference for curation and communication. If appropriate, the latest results from sustainability-related research projects

can also be addressed, or the museum's existing know-how in the field of sustainability science can be incorporated. Integrating socially important and controversial topics can contribute to current discourses – and thus further increase the contribution towards social transformation.

The wicked problems of the present are often linked to the natural sciences in one way or another. Compared to other types of museums, natural history museums are therefore the perfect place to arouse the interest of the public in these topics. Drawing on the knowledge contained in natural science collections, they can develop a social forum for discussing global futures in the form of a "Natural Futures Museum" (Garthe 2018). Science and technology museums are also eminently suitable for moderating key aspects of the sustainability discourse. For example, they can address in an authentic and striking way how industrial development has often neglected the relationships between nature and people in indigenous communities, and the fact that industrialisation is one of the main causes of climate change (Evans and Achiam 2021, 1204).

Good practice

Negotiating the present

Stapferhaus, Switzerland

The Stapferhaus was conceived, not as a museum, but as an institution with the purpose of negotiating the present with a wide audience. Being free in the choice of the format it was thus able to grow from a conference venue to a museum with an entirely immaterial collection: Its cellar doesn't store objects, but instead stories about the present, which the Stapferhaus team sought out from among the population and which made their way into the exhibitions in the most diverse formats. However, the heart of the Stapferhaus is not about this collection (of stories), but about staging these stories and themes and becoming a place of dialogue and thus opening up new perspectives.

How is this made possible? It starts with the selection of a theme, which isn't geared towards the most predictable interest but instead towards what is most urgent and with extensive inquiry, which leads us not only to experts but also to the laypeople with practical experience. One example is the feedback from a social media follower, regarding what she would like to see in the "Gender & Sex" exhibition: "An exhibition that I can go to with the whole family. So that I can address the topic outside of the left-wing/right-wing squabbles. That would be so nice. So healing. So important". Sentences like these are not only formative for the conception but also form part of the implementation of every exhibition.

The laypeople with practical experience not only affect the inquiry, but also they have their say in the exhibitions and are invited to contribute their opinions in the run-up to and during the exhibition: For the exhibition "Fake", they sent us their lies – which included harmless white lies, but also highly political ones – for "Heimat" one of the questions they answered was about who a homeland or country belongs to and for "Gender & Sex" if they ever felt they were at a disadvantage because of their gender. The Stapferhaus deliberately searches for answers outside the museum bubble. So, old, white men also have their say in "Gender & Sex", as do people who fear foreigners in "Heimat".

The Stapferhaus' task then lies in curating this diversity of voices, to involve the audience and ensure that this is always done with respect. It is also important to present the themes in a way, that they become spaces of experience, where confronting the difficult questions of the present and the practice of tolerating ambiguity prove to be not a burden but a pleasure. The objective is always that the visitors leave the Stapferhaus feeling empowered and ready to help shape the present responsibly and thus contribute to a sustainable future.

Contributed by
Sibylle Lichtensteiger

9.2 Transformative curating and exhibiting

Exhibitions in the sustainable museum use the traditional approaches of curating and exhibiting and develop them further under the framework of sustainability communication. One basic principle here is to transfer the values of sustainability and to strengthen specific perspectives and contexts of meaning. For example, social justice as a principle of curating and exhibiting can mean valuing and giving space to alternative traditions of curatorial practice. This applies in particular to indigenous approaches and curatorial traditions with regard to conservation and presentation. Paying more attention to such indigenous curation not only contributes to reflections on the spirituality and materiality of objects, but also relates the museum as a whole to indigenous approaches to conservation and mediation (Kreps 2008, 193–194). Social sustainability in exhibitions is characterised overall by a focus on the perspectives of other disadvantaged social groups. This includes, for example, the queer re-interpretation of traditional historical narratives or forms of presentation which are otherwise usually based on male-hetero-normative assumptions (Mills 2010, 83).

The integration of specific perspectives can also strengthen the local embeddedness and effectiveness of museums. Thus, a specific connection to a locality can be realised through the stronger integration of a sense of place. Such site-specific programming uses the unique characteristics of a

place to develop programmes, exhibitions and events. Focusing on this perspective strengthens the role of museums as actors in local dialogues and their positive influence on local communities. Giving space to local perspectives can not only contribute to the cultural and economic well-being of stakeholders; such unique and truthful perspectives can also significantly enrich curatorial work (Utt and Olsen 2007, 299). A direct link to a specific place, its qualities and characteristics, can represent the core of any sustainable programme in the form of a sense of place or an interpretation of nature and culture, because sustainable development is always locally based in order to achieve global goals. Such an approach is inclusive and open to otherness, because a place can have multiple identities and does not serve to exclude other people, such as people with a migration background. Especially against the backdrop of global migration, museums can serve as a place to reflect on and discuss spatial identity, to propagate an inclusive sense of place and to raise awareness of and support local otherness (Whitehead and Lanz 2019, 21–26).

Alongside the importance of the local level for sustainability-aware curating and exhibiting, temporal aspects also play a further role. Taking into account the long time horizons and the uncertainty of the dynamics involved leads to an increasing importance for scenarios and futurology perspectives. Models and scenarios of climate change are the most prominent examples. This perspective can take on greater significance in museums when futurology methods are applied and integrated in exhibitions and curatorial practice. Scenarios, however, do not have to be limited to geophysical climate development, but can very concretely conceive and visualise the realities of life in the future. In addition to communicating the findings of futurology and discussing images of the future, museums can also involve themselves in futurology processes and thus participate in the development of the visions, utopias, paradigms and scenarios that will increasingly shape societal discourse. Museums bring a unique and very specific perspective to this, as they can link history with the future and enrich the methods of futurology and the thinking about long-time horizons by bringing in their historical perspectives (Salazar 2015, 104). Museum visits can change perspectives on long-term global challenges, especially when visitors themselves can influence the processes of scenario development. When participatory formats and interactive exhibits motivate visitors to think creatively about their own future and thus set in motion a joint process in which possible futures are imagined, reflected upon and discussed, then exhibitions contribute to a global transformation with a long-term perspective. Museums as counter-places to everyday social routine also make possible the inclusion of new perspectives and of what was previously unimagined (McGhie et al. 2020, 193). In this sense, sustainable programming can also be thought of as slow programming. This can be understood as projects designed for the long term which move beyond the current thinking around exhibitions and the impact horizon of museums. A long-term approach of this kind is also accompanied by a dynamic, a slowness and a mindfulness that can be easily linked to processes of sustainability.

Such approaches to the development of the future, for example in relation to climate change, are particularly suitable for translation into narrative scenarios (Veland et al. 2018, 43).

Storytelling and narratives of sustainability

Stories are particularly important for sustainability communication because narrative structures serve to make sense of observations, generate new conclusions and develop models for change. Stories are the basis for developing an understanding of how the world can be changed. Collective narratives provide a sense of security in situations of change and upheaval. In contrast, a "narrative vacuum" limits the effectiveness of sustainability communication (Veland et al. 2018, 42–43).

Storytelling for sustainability is embedded in a normative framework. Firstly, it addresses a shift towards greater sustainability; at the same time, the story aims to enhance the ability of learners to act in a self-reliant and reflective way (Fischer et al. 2020, 41). Storytelling with regard to sustainability offers the opportunity to raise awareness, simplify the reception of complex information and contribute to overcoming cultural barriers. A good example of this is the communication with and addressing of target groups who have limited contact in their everyday lives with science and with scientific findings as a basis for behavioural decisions. In addition, stories can raise moral issues and thus open up a normative resonance chamber. Storytelling is thus an ideal tool for reflecting on the fundamental values of sustainability. Storytelling also offers an opportunity to relate to and empathise with the life experiences of others – the basis for social justice, which is a foundation of sustainable global development (Fischer et al. 2020, 44–45).

Sustainability communication in exhibitions can develop narratives that use identifiable actors, motives, causes and effects (Marshall 2015, 38). If stories are already being used, it is not uncommon to find a top-down communicative approach in museums modelled on traditional science communication (Veland et al. 2018, 43). In contrast, storytelling for sustainability uses the basic components of storytelling such as plot, personalisation, dramaturgy, chronology, context, stylistics, tonality and modality and focuses these on the desired outcomes in terms of education or skills acquisition as well as on sustainability in general and ESD in particular. Such transformative stories make less use of the traditional stories of heroism, but instead respect contradictory world views and strengthen the ability of the listeners to deal with the problems and conflicts in a positive way in the long term (Haraway 2016, 119).

For effective sustainability communication, transformative narratives can also be developed that integrate non-textual stories. For example, mathematical narratives provide a starting point for communicating issues that are dominated by natural science in a new way (Veland et al. 2018, 43–44). One challenge this presents is that the necessary reduction of complexity must not

lead to distorting over-simplification (Fischer et al. 2020, 45). But the narrative deficit in the museum will persist in the future if no genuinely new transformative stories are created.

Complexity and uncertainty require new interactions

Interactive exhibits are an ideal means of supplementing exhibitions to make the complexity of sustainability a tangible experience. Media exhibits in particular are able to convey the interconnections and interdependencies that are so important for the functioning of social-ecological systems. Interactive exhibits and responsive media installations are particularly suitable for conveying systemic knowledge and helping visitors to understand sustainability. Thinking in scenarios – a key element of futurology – can also be demonstrated and experienced in an impressive way through interactive media. These provide immersive experiences, such as virtual environments or "serious games" that visualise global futures, which can complement the exhibition and support the educational mission. Serious games are games designed for educational purposes that deal with serious content or mimic real-world or sustainability problems. They can enable users to adopt different perspectives or test out different options for action.

Group experiences and collaborative learning in virtual environments are particularly compatible with online gaming and present an opportunity for museums to convey museum content in an authentic way and to clearly distinguish themselves from formal teaching-learning situations. For children and young adults in particular, guidance or instruction is helpful in order to deepen the learning experience (Apostolellis et al. 2018, 37).

In addition to conveying complexity in a playful way, interactive exhibits also offer an opportunity to target the promotion of sustainable behaviour among visitors (see Bendor 2018). The gap between intended and actual behaviour is a crucial challenge for sustainable behaviour; habit and routines also determine whether an intention is translated into action (vgl. Kap.4.3). Interactive exhibits can not only simulate and anticipate real decision-making situations; they can also be designed in such a way that planned sustainable behaviour can be practised, and thus implemented more easily in later real-life situations.

"Augmented reality" applications offer optimal synergy between interactive, digital experiences and object-related exhibition work. Objects and works of art can thereby be enriched with different and individually adjustable layers of information and supplemented and contextualised by the use of media. Furthermore, they can be experienced in their original contexts of meaning as well as transferred into new narratives. Gamification enables the virtual modification of objects or, for example, the direct conversion of favourite objects from the exhibition into souvenirs in the museum shop.

A key problem with the developmental options outlined here is the potential overloading of the museum experience, which is essentially based on the aura of the object, through the use of different media. Here, it is

definitely necessary to find a balance that exploits the complementary potential of the media without letting the objects fade into the background. This balance will not only differ from museum to museum, but it can also change within a single exhibition. Both approaches – interactive media exhibits and digital layers on the one hand and contemplative perception and appreciation of objects on the other – can coexist and be deployed in a single exhibition. Nevertheless, visitors will inevitably spend less time with the physical objects and in the exhibition itself because of media and digital options. Here, it is important to overcome the fear of contact and to think undogmatically from the visitor's point of view about audience orientation. On the one hand, digital and virtual experiences will never replace personal contact and the social relevance for the museum building that arises from it. On the other hand, the opportunities that virtual environments offer museums, for example in the context of "serious games", should not be underestimated. There, too, emotional and social connections are made that increase the importance of the museum as a relevant place and that can lead to repeat visits. Overall, purely digital experiences not only reduce access barriers, but also open up museums to other interested parties all over the world and thus increase the visibility of museums in everyday digital life.

Digitality as an opportunity for audience orientation

The implementation of a digitalisation strategy in museums also facilitates a radical user focus and a new kind of orientation towards the audience. Stakeholder engagement and comprehensive participation strategies, both in exhibitions and in the curation process, are leading to a new understanding of how museums engage with their audiences. The focus is on the development of digital platforms that enable collaboration, content generation and social learning. Such digital experiences in exhibitions can also be geared towards crowdsourcing, which enables content creation and can lead to tagging on social media, co-curation and more. These platforms foster a long-term dialogue with visitors that ideally leads to an ongoing involvement in supporting sustainability (see Vermeeren et al. 2018, 4). This creates a stronger bond between the public and the museum, and increases the visitors' sense of ownership. Such digital platforms can combine, for example, conservation and collection-relevant data with experiences for visitors, and can bring together specialist scientific concerns with citizen science approaches, or curatorial perspectives with social media narratives. The development of these platforms can thus be understood as a virtual extension of the museum as a social locus in the digital realm.

With regard to the transformational impact of museums, digital technologies in exhibitions have the potential to reach out to visitors in their everyday digital lives. The digitalisation of exhibitions thus brings with it a direct link to the everyday life of the public. Topics, messages and questions from the exhibition context can be linked to the relevant discourses in the respective

target group via real-time data, artificial intelligence and interfaces with social media. Ideally, this will not only enhance the relevance of the exhibition, but will also lead to intensive audience participation (Giannini and Bowen 2019, 211–212). In this sense, digitalisation also supports a shift from museum work *for* visitors to work *with* visitors. Digital technologies facilitate participatory experiences and enable a fundamental shift to an understanding of the museum as a place of participation and involvement (Bautista 2014, 225).

Focusing digitalisation on visitors also creates new opportunities: the museum audience is joined by visitors whose experience of the museum is exclusively digital. Reaching out to, developing and retaining this digital audience pose new challenges for all of the museum's external communication activities (Frenzel 2019, 226).

Sustainable exhibition design and transformational scenography

Designing exhibitions for sustainability starts from the principles of eco-design and extends these through the addition of other dimensions of sustainability, e.g. socially conscious design or design altruism. Another new approach is that of design activism (Fuad-Luke 2009, 27), which works towards sustainable change and is thus also explicitly political and addresses social injustices. In this sense, design primarily provides the context in which individuals can more easily comprehend or implement a change in behaviour (Niedderer et al. 2016, 70).

In order to make the design process itself more sustainable, designers can draw on different approaches. These include "design thinking" or approaches such as "co-design". Systemic perspectives and concepts from ecology can also enrich the work of designers. These include approaches such as team learning, the use of constraints to improve design, the inclusion of stakeholders or the principles of permaculture or biomimetics (Jedlicka 2010, 145–247). Through collaborative processes such as participatory design, sustainable solutions with long-term value can emerge. In contrast, design processes that do not involve collaboration only deliver short-term solutions that are also likely to be less sustainable (Chick and Micklethwaite 2011, 46). Open-source design can be used to improve the effectiveness of good design approaches for sustainable design by enabling easier dissemination of drafts (Chick and Micklethwaite 2011, 49).

Transformational scenography is based on the transfer of ideas and principles from sustainability theory, post-growth thinking and the discourse on social transformation into a spatial context. Ideally, the design language and the architecture of the spatial images support the psychological insights gained from communication research. For example, a participatory and responsive spatial design can symbolise the importance of cooperation for solving the climate crisis and make it a profound experience. The development of this kind of spatial sustainability communication follows the principles of design for sustainability and design activism.

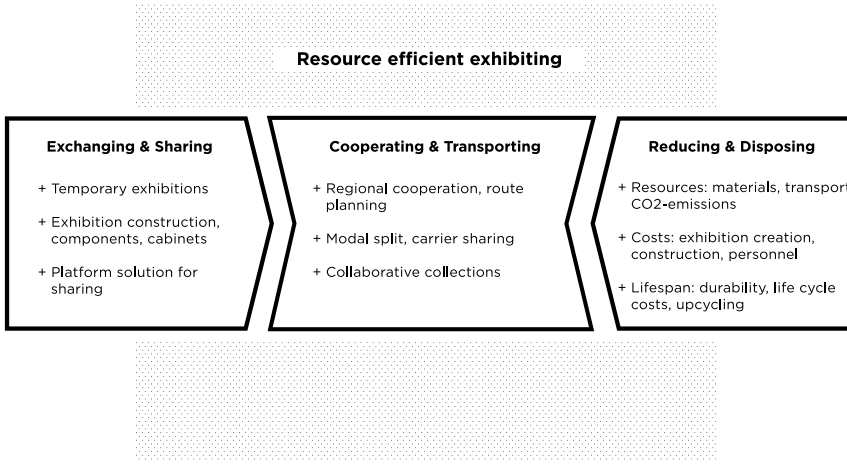

Figure 9.2 Ecological-collaborative exhibition production.

9.3 Sharing and sustainable production

In addition to ensuring that they contain links to the subject matter of sustainability, the negative ecological effects of how exhibitions are created should also be taken into account. In order for exhibitions to be staged as sustainably as possible, criteria for resource-efficient production should already be integrated into the planning and design process (see Figure 9.2).

Eco-design principles are a suitable starting point for such a design process (see Yeang and Woo 2010). Waste management in particular must also be taken into account. The focus here is clearly on preventing waste through loans, sharing, exchange and reuse of entire components and parts of the exhibition architecture. In addition to these more organisational solutions for waste avoidance, aspects such as low material consumption, durability, reusability and modularity must be central to the design process. Already in the design phase, consideration can be given to which parts and materials could be reused for other exhibitions. The planning and design of exhibitions can be comprehensively geared towards economising on materials.

Exhibitions are often developed in collaboration with external service providers or designers. In the spirit of sustainable procurement (vgl. Kap. 6.2) it should be ensured that they comply with previously defined sustainability standards. Ideally, these requirements should already play a role in the tendering process and should then also be stipulated in contracts.

The sustainable production of exhibitions and the consistent implementation of eco-design principles will inevitably lead to conflicting goals in the development of exhibitions. Potentially higher costs for more sustainable products and materials are the most banal, though not the least important, source of conflict. The crucial conflict, however, is over the design itself, and thus the creative freedom of the designers. Often, the desired design is at odds with the goal of sustainable production or reusability. Here, new solutions

can only be sought collectively if both goals are to be reconciled. In any event, a capacity for compromise is required on the part of the designers as well. In summary, sustainability criteria must be balanced against competing interests, such as curation, education and design, in every exhibition project (vgl. Kap.13.1).

Environmentally friendly materials and life cycle assessment

In order to capture the downstream impacts of museums as well, exhibitions in particular should be assessed using the instrument of environmental accounting or life cycle assessment (vgl. Kap. 6.2). The results of the assessment should be used not only to select materials and products, but throughout the planning process, in order to optimise the exhibition's contribution to sustainability. For permanent exhibitions, a life cycle cost analysis should be used instead of a life cycle analysis, if possible, in order to take into account what is typically a long period of use.

A variety of different materials are used during the preparation and construction of exhibitions. These should be selected according to their environmental impact. The following materials can be recommended for use:

- materials with a favourable life cycle assessment (if available),
- non-toxic materials,
- materials and products with an ecological or environmental label,
- recycled materials,
- materials suitable for upcycling,
- composite materials are to be avoided.

For all the different types of materials, there are general starting points which can be used to make their selection and use more environmentally friendly.

As a renewable resource, wood offers many advantages, such as good insulating properties, a small ecological footprint, biodegradability and the possibility of recycling. When using wood, one important consideration is sustainable forest management, which can be verified by certification schemes such as the Forest Stewardship Council (FSC). In addition, locally sourced wood should be chosen whenever possible in order to minimise transport emissions.

Cardboard is durable, inexpensive and malleable and can be protected with environmentally friendly coatings. It can come from sustainable forestry, which can be certified by a number of quality labels. Ideally, recycled cardboard should be used, which can also be easily recycled again. Cardboard and, in particular, honeycomb sheeting made from cardboard is a good option, and its potential for use in exhibition design has not yet remotely been exhausted.

Materials made from renewable raw materials such as hemp or bioplastics can provide an alternative to traditional materials. However, switching to so-called green alternatives without more information can be a mistake. Here,

too, a detailed life cycle analysis of these alternative materials must be carried out and compared with those for traditional materials.

Plastics such as PVC, which are usually made from oil, should be avoided if possible. An environmentally friendly plastic option is the use of twin-wall sheets.

Composite materials can pose a problem, as they can usually only be recycled with great difficulty if at all. They include foam boards and wood-based materials. Wood-based materials such as laminated timber, plywood, oriented strand board (OSB) and medium-density fibreboard (MDF) are often characterised by having greater structural strength than conventional wood. In terms of ecological footprint, wood-based materials can be of interest if they are made from the by-products of other processes or from wood that grows back rapidly. Recycled wood, especially in the form of chipboard, also has advantages in this respect. However, pollutants such as synthetic adhesives and binders are often used in its production. Plywood, OSB boards and chipboard usually contain fewer binders than MDF or HPL boards. Labels also provide information about the amount of pollutants used. Because of this, they are not compostable or biodegradable. If possible, composite materials should be avoided.

In the group of materials comprising adhesives, paints, sealants and the like, particular attention should be paid to volatile organic compounds (VOCs), which outgas slowly. The guiding principle here is to choose products without potentially harmful or toxic components. For example, there are adhesives and paints that are water or plant-based.

As an essential component of exhibitions, display cases combine different materials meeting a variety of requirements. For display cases in particular, it therefore makes sense to consider life cycle costs. In addition to their durability, attention should also be paid to whether the materials used are free of pollutants and do not emit volatile substances. Special adhesives and sealants as well as acetic acid-free silicones can be used, among other things. Cardboard and paper products should also be acid-free wherever possible.

Printed products for exhibitions include signs and panels as well as direct printing on a wide variety of materials and surfaces. Numerous print products are also used to complement the exhibition, such as a variety of promotional materials like posters, banners, flyers and programmes, as well as educational materials and handouts, although these are not specific to the exhibition context. The environmental impact of printed products depends largely on the substrate used, the inks and the finishing. For inks, paints and coatings, attention must also be paid to environmentally harmful components such as metals or volatile substances. Furthermore, the sustainability of printed elements depends on the choice of substrate materials such as films, papers, composites or textiles. Printable substrates vary widely in terms of the resources consumed and their sustainability (see Jedlicka 2010; Sherin 2008). When using decals, PVC film should be avoided.

Media technology and energy efficiency

The use of electronic components and media technology is increasing in exhibitions. The buzzwords "green IT" or "sustainable AV" refer to efforts to evaluate media technology from an ecological or sustainability point of view (see bspw. Maxwell and Miller 2012; Berkhout and Hertin 2004). The sustainability impacts of media, AV and IT products arise not only through production, use and disposal, but also through indirect impacts such as rebound effects (Williams 2011, 357). Media technology components can be assessed for their sustainability under various aspects. These include:

- resource consumption in the course of production,
- embodied energy, i.e. the energy used over the entire life cycle of the equipment (manufacture, transport, storage, sale, disposal),
- energy consumption,
- production from recycled materials,
- use of recyclable materials (see bspw. Pini et al. 2019),
- use of materials low in pollutants,
- service life, especially for lighting.

Energy efficiency is usually taken into account in any selection process based on environmental impact. This is where labels such as Energy Star can make selection easier. However, complex media technology systems also entail trade-offs between different sustainability goals. One example which is still relatively straightforward is the selection of the most energy-efficient light source, which, however, produces so much heat in a display case that additional air-conditioning becomes necessary. This example makes it clear that detailed data on components is required for sustainable planning. In order to simplify the selection of the most sustainable products, life cycle analyses are necessary, which are already common for end-customer products, but still very rare for professional products for use in museums and exhibitions. The rapid development of the IT sector also leads to methodological difficulties that complicate the preparation of life cycle analyses (Cheung et al. 2018; Arushanyan 2013).

In part because of the paucity of such information, components are often selected solely on the basis of technical quality criteria as well as acquisition costs and, where applicable, operating costs and service life. However, operating costs are largely determined by the labour costs associated with the maintenance required. From a purely economic perspective, products are therefore cheaper if they are replaceable instead of requiring maintenance, such as the replacement of a projector lamp. On the manufacturing side, this results in increasing numbers of expensive technical devices that are designed to be disposable. In order to improve the sustainability of media technology in museums, museums should define binding specifications for equipment and certification. Furthermore, tenders should include not only energy efficiency but also life cycle analysis as a criterion, and bidders should be asked to demonstrate how the most sustainable products were selected.

Sharing, modular systems and exhibition exchange platforms

The unsustainability of the way museums work is particularly obvious with large and elaborate temporary exhibitions, which generate a lot of waste after dismantling. Here, sharing economy approaches can have a much stronger positive impact on the environmental sustainability of the exhibition sector than the small-scale solutions shown above.

The "sharing economy", or "collaborative consumption", can be understood to mean using information technology to enable the distribution, sharing and reuse of products and services (Heinrichs 2013, 229). Collaborative consumption also shows the way from consumerism to active citizenship: the aspect of community is added to material consumption and thereby extends it such that it becomes responsible behaviour for a sustainable society (see Botsman and Rogers 2011).

A good starting point for implementing these ideas is the development of modular systems for exhibition architecture. These can be developed and deployed internally in the museum. Alternatively, not least because of the high initial investment costs and the pressure on storage capacities, they can be developed within museum networks or as a cooperative project within a city or a metropolitan region. If necessary, city- or region-wide depots can be set up as part of this process, which as a long-term facility could significantly reduce the development costs of temporary exhibitions for all participating museums. In addition, companies sell modular systems that are reusable and can be easily stored. The severe constraints imposed thereby on design and especially scenographic options need not be seen as an obstacle, but can potentially unleash new creative ideas.

One-off special exhibitions can be very unsustainable not only in terms of exhibition construction and cabinets, which are usually disposed of after the exhibition ends, but also in terms of resources and costs for curation and design. While travelling exhibitions are intrinsically more sustainable due to their repeated deployment, they can also have unsustainable impacts due to transport and packaging. Travelling exhibitions offer particular opportunities for economic sustainability, as the costs of development can be shared between several institutions, and smaller museums can benefit from the structures and knowledge of larger museums. Various collaboration models are possible for travelling exhibitions. Firstly, travelling exhibitions can be designed by one museum and then lent to other museums; secondly, several museums can complement each other's skills and thus create a travelling exhibition that can be shown successively in the participating museums; thirdly, private-sector providers can develop exhibitions on their own initiative which are then lent to museums. Even though travelling exhibitions are already very often created collaboratively, this model is still far from being the standard way of doing things. In the spirit of sustainability and cooperation, the reduced expenditure on content development and design within the museum sector can perhaps be considered more important than developing unique selling points through individually produced exhibitions.

Exchange platforms for travelling exhibitions and special exhibitions are an important way of initiating collaborative projects, promoting travelling exhibitions as a whole and marketing them. The sharing economy concept is here applied to the entire exhibition sector. A well-functioning exhibition exchange platform brings enormous advantages: with an easily accessible online presence, it can be the first point of contact for museums planning special exhibitions and can therefore contribute significantly to the repeat use of special and travelling exhibitions. In addition to the economic advantages offered to museums by the sharing approach, it also enables an extended useful life for exhibitions and thus a smaller ecological footprint. Small and medium-sized museums can benefit particularly from this, as they may be able to present highly attractive exhibitions on their premises towards the end of the viable lifespan of an exhibition.

9.4 From loans to collaborative collecting

Making important cultural assets accessible to as many people as possible is one of the most important tasks of museums. Initiatives such as "Lending to Europe" (de Leeuw et al. 2005) support this goal, simplifying international transport and contributing to an increase in loan traffic, including loans of individual objects. In addition, the field of travelling exhibitions is also growing, due especially to elaborately curated exhibitions tailored to a mass audience. Such blockbuster exhibitions usually generate enormously high visitor numbers and thus also considerable and often necessary income for museums. As important as these functions of museums are, the unsustainable impacts of such developments must not be ignored.

New forms of risk management and the modal split

The negative impacts include resource consumption and the carbon footprint of the numerous and often international shipments. Taking these impacts into account requires a new evaluation of traditional risk management within the loan system. In addition to the evaluation of risk to the objects themselves, the assessment of risk to the environment and society from the climate-damaging effects of loan transportation must also be taken into account. These impacts must be weighed up against each other within the framework of a new type of risk management. Such an approach must take into account in particular those areas of lending that are likely to have the greatest negative impacts in terms of sustainability. These include transport and packaging. Currently, collection items are mainly transported by diesel-powered and air-conditioned trucks and kerosene-powered aircraft. The decisive first step to reducing ecologically damaging impacts is therefore to change the choice of transport mode, the modal split. Loan transportation must move away from road and air, towards more use of ship and rail. Currently, however, rail transport is rarely considered as an option. One hurdle to changing the modal split is the lack of research on the risk to objects

when transported by other means, and thus the lack of a basis for decision-making for conservators and registrars, as well as for insurance companies. This often means that familiar and established methods such as lorry transport are used. If lorry transport is indispensable, haulage companies should be chosen that pay attention to sustainability aspects in their operations and can at least demonstrate that their vehicles are ecologically optimised. This includes, for example, the use of generators for the air-conditioning system, so as to reduce engine idling, and aerodynamic trailers.

Packaging and materials

With regard to packaging and the materials used for lending, it is important to distinguish between proximate packaging, or padding, and the transport container itself. Transport containers are often wooden boxes made individually for a specific item and used once. Packaging material usually consists of petroleum-based plastics and foams. Insofar as life cycle analyses are available at all, the packaging materials used are generally not very sustainable, and some of them emit highly volatile substances at room temperature. In addition, due to the workflows in museums and the lack of storage space, a considerable amount of material is often wasted and hardly ever reused. From a purely economic point of view, this is also understandable, as storage costs and warehouse management would significantly exceed the costs of the packaging material (Warden 2009, 55–56).

In the field of transport packaging, too, the central approach should follow the classic 3R formula: reduce – reuse – recycle. Since transport containers are usually indispensable, the focus here is on reuse. Since reuse is usually not possible due to a lack of storage capacity (Warden 2009, 54), renting transport packaging is a good option. Overall, there are still too few sustainable alternatives in the area of the transport of cultural goods – from packaging materials and transport containers to a sharing platform for couriers.

Dispensing with courier services and reorganising the loan system

Many transported items are accompanied by a courier provided by the lender. However, climate accounting research (Lambert and Henderson 2011) has shown that couriers are responsible for a significant proportion of the $C0_2$ emissions associated with such transports. Couriers should therefore not be used habitually, but only in well-justified cases. Couriers can also combine tasks from different institutions, e.g. a courier from a borrower can be used when an object is transported between two borrowing museums. It is particularly damaging to the climate if the transported item occupies an aeroplane seat, so other transport methods should be found instead (Lambert and Henderson 2011, 225).

Route planning, for example of travelling exhibitions, can also contribute to a more sustainable loan system. Thus, a new planning and reservation system could be developed in which the lenders manage the loan not according to time slots but according to the locations of the borrowers.

For example, exhibitions could be offered within a given region for a set period of time. Similarly, the cooperative scheduling of travelling exhibitions could be aligned more with geographical regions and with neighbouring countries than with scheduled opening dates in specific museums (Lambert and Henderson 2011, 226).

Rethinking the transportation of cultural goods

A fundamental approach to improving the climate-damaging impact of the loan system is to reflect on the necessity for the transportation of cultural objects. From the perspective of the sustainable museum, the credo for making cultural property accessible to everyone could be reconsidered. In line with post-growth thinking, here, too, a reduction in the number of items on loan is the goal. While conservation needs and sustainability management requirements are often in conflict with storage in depots, they go hand in hand in the loan system: fewer transports mean less risk to the objects as well as less negative impact on the environment. From the conservator's point of view, the lowest risk for an object is if the object is not transported.

Instead of aiming for quantitative growth, the effectiveness of loans can be increased. A sustainable loan system uses each object to achieve the greatest possible impact for visitors and for the public at large.

The sharing economy is based on the principle of collaborative consumption, which can be deployed for lending in the form of a collaborative collection. In a collaborative collection, collection items are rarely in their depot, but are, for example, transferred to small museums on a long-term basis. They can also be transferred from exhibition to exhibition without always returning as loans to their place of origin. One reason why the implementation of a collaborative collection project is challenging is that it involves many different actors: conservators, registrars, curators, packers, shippers, couriers and others. One of the biggest obstacles is the lack of information about alternatives, as this makes it difficult to assess the risk to the objects.

Toolbox

Sustainable practice | Exhibitions and curation

1 Using exhibitions to reflect on sustainability, conflicting goals and approaches to tackling global challenges.
2 Reducing loans and trips by couriers, and transporting objects by rail and ship.
3 Using reusable display systems.
4 Not using petroleum-based plastics or polluting composite materials in the construction of exhibitions.
5 Creating a safe space for dialogue between different groups and milieus.

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10 Sustainable education and participation in museums

Knowledge of and enthusiasm for sustainability are disseminated to the wider society through museum audiences. The museum audience is thus a key to the social impact of museums. Museum education activities are therefore particularly important, as this is where museum staff come into direct and intensive contact with the public. How can education in museums benefit from the Education for Sustainable Development approach? What role does participation play in the sustainable museum? Under the motto of sustainability and participation, educational and outreach work takes on new significance for museums.

	Vision
Identity	Providing a learning environment for the acquisition of competences for the creation of a sustainable future
Expertise	Education for sustainable development, Agenda 2030, strong participatory competence
Practice	Incorporating transformative education in collections and formats, strengthening local embeddedness, community engagement and activism

10.1 The museum as a place of learning for transformation

Museums differ from places of learning in formal education not only in the openness of the learning process and the diversity of opportunities for participation, but above all in their configuration as a sociocultural learning environment (Wertsch 2010, 117). Here, social learning for sustainability as a search process can gain particular relevance. People and human exchange are especially central to work in face-to-face education. In these situations, mindfulness and reflexive practice with regard to social equality and discrimination are important. Among other things, ethnic origin, skin colour and sexual orientation matter. It is often difficult for white males engaged in educational work to find an authentic path that takes all the pitfalls into account and to avoid unconsciously reproducing re-discriminatory perspectives (Heller 2017, 3).

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This social learning process can be enriched by objects, as visitors can interact with and around objects in many ways. Drawing on their knowledge and attitudes, they can uncover rich associations and thus experience museums as meaningful places of learning (Rowe 2010, 33). Linking objects with the everyday life of the visitors and thus bringing them into a meaningful context is a promising starting point for learning in the museum (Csikszentmihalyi and Hermanson 1995, 73). Museums, as physical contexts, thus represent very special learning environments. With regard to issues of sustainability, this contextual understanding of learning (see Falk and Dierking 2000, 65) acquires a special significance, as the need to classify information and experiences and to ascribe meaning to them is particularly acute when it comes to complex problems. Museums can achieve this contextualisation better than other learning environments through the interaction of space, objects, media, individuals and groups.

Transformative learning and sustainability

The transformative learning approach is especially appropriate for work on wicked problems, as it helps with the perception and questioning of individual conditioning, assumptions and frames of reference (see Christie et al. 2015, 21). Transformative learning aims at change generated through autonomous thinking and a positioning within a frame of reference (Mezirow 1997, 5). Sustainability can provide this frame of reference here. Transformative learning also aims to enhance people's capacity for reflection in relation to their own interpretive perspectives (Getzin and Singer-Brodowski 2016, 43). Transformative learning is a theoretical approach that facilitates the integration of Education for Sustainable Development (ESD). ESD thus follows a critical and emancipatory concept which is reflected in particular in various sub-competences of *Gestaltungskompetenz* (shaping competence). Sustainability as a normative concept is not incorporated in ESD in terms of content or learning objectives, but provides a value-based framework for the development of critical faculties, democratic maturity and *Gestaltungskompetenz*. ESD therefore does not subscribe to an instrumental understanding and does not seek to teach sustainable behaviour.

Education and mediation in museums is ideally suited to the implementation of the approaches outlined above, because problem-based learning, project-oriented and research-based learning can take place here in a unique setting. Reflecting on one's own attitude towards concepts such as growth, development or the good life requires time and discussion. It often leads to cognitive dissonance or triggers emotional reactions. In order to enable and support such reflection, didactic programmes and interactive experiences should explicitly provide for intensive phases of reflection (Getzin and Singer-Brodowski 2016, 43). Museums can accompany this process of reflection as part of their wider programme and provide the venue for the ensuing discourse. The application of transformative learning in museums requires

above all a focus on the design of the learning environment. Paying greater attention to the learning environment also means framing it in terms of transformative education in exhibitions and educational activities (see Cohen and Heinecke 2018, 280–281).

The museum as a learning organisation

In the spirit of transformative learning, educational professionals in museums act as enablers and provocateurs, providing a learning environment in which visitors learn in a self-determined and autonomous way (Mezirow 1997, 10–11). However, museum educators also face a major challenge: sustainability is a comprehensive concept that responds to uncertainties and deals with complexity. Any pedagogical work on sustainability must therefore, and more so than in other subject areas, find approaches and instruments appropriate to the respective situation in order to make the unwieldy guiding principle of sustainability productive in teaching-learning situations (Daskolia and Kynigos 2012, 818).

Sustainability, as a long-term process of change, includes at its core a perspective on learning and growth (cf. Chapter 5.3). This development of individuals and of the organisation as a whole forms the basis for successful sustainability management (see Chai 2009, 102–103). The transformation of museums into sustainable institutions requires a great deal of new knowledge. In the spirit of a learning organisation, museums can support their staff in this learning process. This includes having a learning strategy, creating learning structures and, in particular, improving the general capacity to learn. On an individual level, the learning capacity of staff and their development as learning personalities can be supported (Zanzinger 1997, 264).

10.2 Education for sustainable development within museum education

In a museum where all activities are geared towards making a greater contribution to sustainable development, ESD will naturally be the core concept behind all the activities of the education department. ESD aims to promote the competencies and values that enable the transition to a sustainable future. It is thus much more than the inclusion of sustainability topics in different learning contexts or the teaching of the scientific fundamentals behind the global crises. Rather, these competences enable people (i) to solve complex problems associated with global challenges, (ii) to make joint decisions concerning their future, and (iii) to develop a lifestyle that contributes to sustainable development (de Haan 2006, 22). Rather, these competences enable people (i) to solve complex problems associated with global challenges, (ii) to make joint decisions concerning their future and (iii) to develop a lifestyle that contributes to sustainable development (de Haan 2006, 22). In addition, ESD also addresses the central values of the guiding principle of sustainability – in particular, social justice and its implementation.

ESD and the sustainable development goals

UNESCO's global framework "ESD 2030" for the period 2020 to 2030 relates ESD activities very specifically to the Sustainable Development Goals (SDGs). The ESD 2030 framework develops approaches on how educational activities can support the achievement of the SDGs. This support can be implemented through the development of multidimensional learning objectives for each of the SDGs (see dazu Rieckmann 2017). Education is relevant to all SDGs, but especially SDG4, as ESD contributes to high-quality education. Target 4.7 specifically addresses ESD and its subject matter and intended effects. The explicit focus on the SDGs is intended to integrate ESD into all SDGs, from the political via the institutional level to individuals and multipliers (United Nations Educational, Scientific and Cultural Organization 2020, 14). ESD 2030 addresses the different dimensions of the learning process. Firstly, it raises awareness of the SDGs; secondly, it enables a better understanding of the SDGs by embedding them in specific contexts; and thirdly, it motivates behaviour and actions that contribute to the achievement of the SDGs (United Nations Educational, Scientific and Cultural Organization 2020, 16). For educational activities within the framework of ESD 2030, this means that they are increasingly focused on the detailed sustainability impacts and less on the results of the learning process (learning outcomes) (United Nations Educational, Scientific and Cultural Organization 2020, 14). Approaches that promote collective action and focus on values such as empathy, respect, solidarity and responsibility are seen as particularly important in this context.

ESD 2030 also brings with it a stronger focus on a wider societal transformation, identifying the specific elements that ESD can contribute to a transformation process (United Nations Educational, Scientific and Cultural Organization 2020, 18). ESD's strength lies in its ability to have an impact at the individual level and thus to contribute to a transformation of society as a whole through behavioural change. In order to further increase its effectiveness, more attention must be paid in future to how ESD can have a direct impact on political and social structures and support the transformation process at this structural and systemic level. In addition to an increased focus on the process of change, new target groups and possibly new instruments for ESD in museums could also become more important (see Figure 10.1).

Integrating ESD in all education sectors and curricula is necessary in order to drive a Great Transformation (Rieckmann 2017, 48–50). Although the informal education sector is mentioned in the ESD 2030 framework concept, museums are not explicitly identified as places that can serve as models in advancing education on science and sustainability in a participatory science society. The importance of the informal sector and especially of museums is still underestimated in this context, or at least not spelled out adequately. The ESD 2030 framework is the perfect opportunity for museums to strengthen their role in ESD. It is the responsibility of the museum sector to ensure that it has a stronger role to play here. In doing so, more attention can be drawn

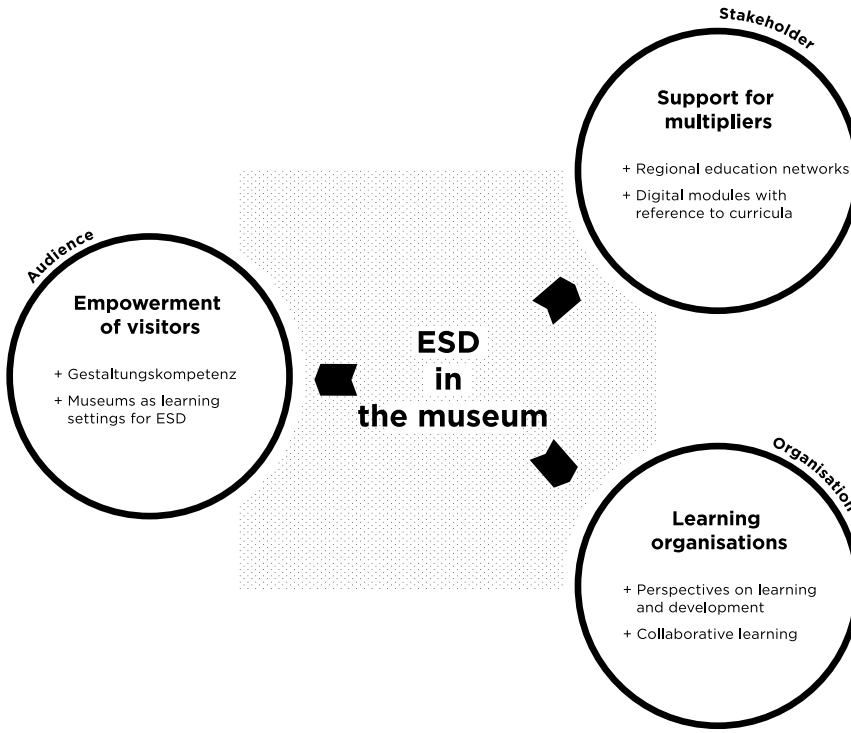

Figure 10.1 Education for sustainable development in the museum.

both to the potential contribution of museums to ESD and to the social impact of museums as a whole. The "whole institution approach" called for in the ESD 2030 framework describes, from an educational perspective, exactly what is being proposed for museums in this book: aligning the institution as a whole on the guiding principle of sustainability.

ESD as a recalcitrant concept in museums

Museums offer a unique venue for informal learning. Numerous museums around the world address global challenges and incorporate sustainability into their exhibitions and educational programmes. For many museums, applying the concept of ESD is still a challenge. Providing visitors with the necessary skills to change not only their behaviour and overall lifestyle, but also their values, is an ambitious undertaking. Museums that take on this challenge have to reorient their interpretation and education work. To do this, they can focus on their specific strengths and consider exactly what their visitors learn from a particular exhibit, but even more so how they learn and interact. An additional difficulty is making the topics relevant to the audience. Sustainability is a broad and far-reaching topic. It is therefore important not

only to deal with topics and problems at a local level, but also to draw links to the everyday life of the visitors. However, ESD is not only relevant for programmes, but ESD approaches can also be implemented in exhibitions. For this, it is best to integrate them into exhibition planning from the very beginning and to make them more and more concrete as the installation progresses.

ESD in the sense of developing *Gestaltungskompetenz* is particularly successful when practical tasks and experiences are also integrated into educational programmes. The key challenge is to acquire competences in the short window of time provided by the museum visit.

Imparting the skills for a sustainable future

The Organisation for Economic Co-operation and Development (Organisation for Economic Co-operation and Development 2005) has identified key competencies for a successful life and a well-functioning society by analysing psychosocial preconditions. These are, in particular, competencies that enable people to find their way in a wide variety of situations and to manage them. The OECD differentiates these key competencies into three different areas. The first is the use of media and other resources and tools. In addition to information technologies, this also includes language itself. Competencies in this area include not only the use but also the adaptation of these tools to achieve one's own goals. The second category is concerned with interaction and cooperation in groups with different, heterogeneous participants. This relates above all to the ability to interact successfully with people from other cultural backgrounds. The third category is concerned with the ability to act autonomously. The prerequisite for this is to reflect on one's own life in a larger, global context and, building on this, to take responsibility for one's own life plan (Organisation for Economic Co-operation and Development 2005, 7). The three categories outlined here interact with each other and together form a basis for determining and situating competencies for sustainable development.

According to de Haan (2010), ESD aims to equip people with competencies with which they can actively and autonomously shape the future in pursuit of sustainable development. People are empowered to make informed decisions on issues related to sustainable development. This so-called *Gestaltungskompetenz* refers to the ability to identify problems of sustainability, develop solutions and deal with future situations in a creative way. *Gestaltungskompetenz* enables people to participate in the society of the future and to help make it sustainable (de Haan 2010, 320). *Gestaltungskompetenz* can be understood as a sustainability-related specification of transformative learning. It uses autonomous thinking to manage the transformation towards sustainability.

In order to put this abstract and overarching concept into practice, various sub-competencies were developed that make up *Gestaltungskompetenz*. The sub-competencies are based in part on sustainability science and in part on

the fundamental values of sustainability. The sub-competencies of *Gestaltungskompetenz*, which in turn can be linked to the OECD key competencies, are the ability to (de Haan 2010):

1 "gather knowledge in a spirit of openness to the world, integrating new perspectives;
2 think and act in a forward-looking manner;
3 acquire knowledge and acting in an interdisciplinary manner;
4 deal with incomplete and overly complex information;
5 co-operate in decision-making processes;
6 cope with individual dilemmatic situation of decision-making;
7 participate in collective decision-making processes;
8 motivate oneself as well as others to become active;
9 reflect upon one's own principles and those of others;
10 refer to the idea of equity in decision-making and planning actions;
11 plan and act autonomously; and
12 show empathy for and solidarity with the disadvantaged".

The museum as a place for acquiring competencies

Museums have specific advantages when it comes to teaching competences. For example, museums contribute to a stabilisation of identity through self-reassurance. With regard to the OECD's competence categories, this also strengthens the individual sense of responsibility (Hinz 2006, 25). While all sub-competencies are suitable for implementation in museum staff education programmes, only certain sub-competencies of *Gestaltungskompetenz* can be imparted successfully in exhibitions.

The sub-competency "gather knowledge in a spirit of openness to the world, integrating new perspectives" is well suited for use in exhibitions, as exhibitions facilitate and encourage people to put themselves in others' shoes. This competency can be applied to a wide range of topics, e.g. to different lifeworlds or to topics such as exclusion and discrimination. Possible starting points for this are the representation of other lifestyles, the depiction of unequal living conditions, reflections on the subjective view of the world in a global context and the demonstration of the consequences of individual and collective behaviour on a global level. A successful implementation in the exhibition context, however, presupposes that people are encouraged to reflect intensively on this new perspective. The sub-competency "acquire knowledge and acting in an interdisciplinary manner" can be very easily integrated into education and outreach work. Interdisciplinary and systemic thinking can be regarded as a central building block for the understanding of global problems and future scenarios. It can be learned through the use of enquiry methods that encourage visitors to seek relevant information, discover relationships within systems and contribute through their own investigations and conclusions. Concrete, real objects always cross disciplinary boundaries and thus encourage

interdisciplinary thinking. Interdisciplinary knowledge can be represented very well by different levels of information about an object. In addition, the various tools (technology, media, images, films, texts, etc.) used in exhibitions offer many and diverse opportunities to convey interdisciplinary perspectives and interdependencies. Discovery learning in the museum can also contribute to this sub-competence. Applying it in an exhibition context, for example, assumes that solutions to a problem can be developed from different points of view. Outside the museum, interdisciplinary thinking can be learned by carrying out applied projects initiated by the museum to address local sustainability problems. The sub-competence "show empathy for and solidarity with the disadvantaged" can be communicated very well through exhibitions because stories and storytelling are people-centred. A change of perspective or the feeling of living someone else's life can be powerful learning experiences. This human approach to objects and to the subject matter of the exhibition can be linked to an everyday real-life situation and is often linked to emotions. Empathy can be facilitated by questions, images, videos or immersive experiences.

In summary, the following competencies appear to be particularly suitable for acquisition in museums (de Haan 2010):

- "gather knowledge in a spirit of openness to the world, integrating new perspectives".
- "acquire knowledge and acting in an interdisciplinary manner".
- "show empathy for and solidarity with the disadvantaged".

The implementation of ESD in the museum, in the pedagogical work and in the exhibition context is influenced by different framework conditions – but a participatory approach is always at the centre of all activities.

10.3 Participation, co-creation and crowdsourcing

Participation is a key element of sustainable development because it empowers people to actively engage in society in order to better meet the challenges of sustainable development. Participatory approaches lead to active citizenship and thus to engaged citizens, a prerequisite for a transformation towards sustainability (Rieckmann and Stoltenberg 2011, 123). Educational processes within the framework of ESD are designed essentially as participatory processes. ESD as a core concept of education and outreach in museums thus also changes the role of teachers, who in the future will act more as enablers or facilitators of learning processes.

The sustainable museum therefore integrates participatory culture in all its forms (see Simon 2010): from co-curation to the Maker movement, from handicrafts to participatory collecting, from co-design to game-based research. However, participation in the museum is not a trivial matter of simply taking part, but is characterised by a variety of preconditions and options (Piontek 2018, 1). Participation also changes the self-perception of the

museum: museums as institutions become central sites for the "social search, learning and design process" (Rieckmann and Stoltenberg 2011, 123) in pursuit of sustainable development. Participation is thus concerned with internal institutional culture, the public and exhibitions, as well as external cooperation (Lyth et al. 2017, 13).

Participation can be implemented with different methods and to different depths. There are three levels that need to be recognised here: participation, collaboration and cocreation. In participation, the museum retains control over the process, in which the participants interact with the contents of the museum. This form is particularly suitable for large numbers of participants. Collaboration and co-creation differ essentially in the extent to which the museum defines the process and content of participation. In a co-creation, participants generally have greater influence. Both forms are suitable for medium to small numbers of participants. The intensity of the exchange and collaboration is largely determined by the number of participants (Simon 2010, 190). Even though participation usually starts from the museum and thus entails an asymmetry in hierarchy and communication, the participatory process is precisely the means to balance out these asymmetrical relationships (Piontek 2016a, 90).

The implementation of participatory approaches often requires didactic and pedagogical expertise, which is why museum educators are particularly well qualified for this. Integrating wide-ranging participation in the museum is thus the responsibility of museum education departments. While this is a cross-cutting task affecting all departments, it requires someone to take responsibility for driving it forward within the museum. With this new added responsibility, education and outreach work acquire a more prominent status within the museum.

One fundamental obstacle to more participation in museums is the fear of museum staff that by opening up to lay people, either the professionalism of museum work will decline or their identity as professionals will be called into question. One way out of this dilemma is to recognise that the participatory aspects can constitute a new and significant element of the identity of museum staff (Tatsi 2014, 145–146). The systematic implementation of a participatory approach leads to a departure from the traditional understanding of a museum audience, as the term always implies one-way communication (see Rosen 2008).

Co-creation and an end to the visitor-centred museum

In addition to the question of the depth of participation, the relevant interfaces with the fields of museum work must also be identified. Depending on the precise activity, there are specific prerequisites and management options for the participatory processes. While participation in the context of Citizen Science has already been formulated in detail and numerous participation formats are available for exhibition and interpretation work, participation in the context of co-collecting and co-conservation is limited by framework

conditions, which is why its implementation is usually more demanding (Piontek 2016b, 201–203). The following approaches offer the most promising options for participation:

- audience-driven content creation,
- co-curation,
- co-production,
- participatory communication formats,
- participation in programme planning and educational projects.

While intensive participation in programme planning is still rare, many museums encourage their visitors to create content on the spot, i.e. to contribute content while visiting an exhibition. The opportunity to contribute to the content of the exhibition triggers new reflective processes among visitors as they actively create content relevant to the subject matter of the exhibition (see Simon 2010). This on-the-spot content creation can be carried out, for example, through surveys, the results of which are directly displayed in the exhibition, through the sharing of personal experiences, through the creation of texts for new exhibition signage, or through the passive creation of content through visitor tracking, which is then integrated into the exhibition in a meaningful way. On-the-spot creation can also include more elaborate content, such as audio recordings made in a small studio booth or the production or contribution of videos. Another possibility is to ask visitors to bring objects to be displayed in an exhibition. These can be historical objects, as often used in participatory local history museums, or personal items. In addition, digital, user-generated content can be displayed and used in exhibitions. This approach includes content that visitors produce at home to display in an exhibition. But it also includes user-generated content that is created in a different context, for example in a Citizen Science project. The challenge for museums is to present this digital content in an accessible, engaging and interactive way.

As participation is often digital, the digital content life cycle model can be helpful in outlining the necessary steps and the opportunities for participation. The digital content life cycle consists of the phases adding, collecting, correcting and transcribing, classifying, contextualising and co-curating. Particularly promising approaches are classification based on metadata for collection objects, e.g. through social tagging, as well as contextualisation through stories or embedding the results in other digital formats (Oomen and Aroyo 2011, 140).

Co-curating gives visitors the opportunity to participate in the activities of the curators. Participation in curatorial practices can be as simple as asking visitors to choose exhibits for the collection. Such social curating embraces participatory approaches, collaboration and social interactions as perfectly normal aspects of curatorial practice (Stuedahl 2018, 219). Digital data can provide several new ways of co-curating. Visitors can select objects they like and thus build virtual collections, which they can also present on the museum

website. A deeper insight into the work of curators can enable them to develop virtual exhibitions. Visitors can arrange objects in a digital space, enrich the objects through the addition of content, then maintain them, thus becoming virtual curators themselves. Visitors can also contribute to curating real exhibitions in the museum through stakeholder workshops. By adopting a participatory approach, curators learn a lot about their audience and their expectations before the exhibition opens, and are able to incorporate these ideas into new exhibitions.

Participation in the life of the museum can also mean physical activities, such as in co-creation labs or repair cafés. Communication tools and media used in education and interpretation can also be improved in terms of sustainability. The planning and implementation of educational activities is particularly suitable for participation. Cooperation partners and visitors can help develop educational programmes or carry out individual activities themselves.

At a more fundamental level, visitors and stakeholders can also be involved in processes of strategy development, programme planning and exhibition design. Co-developing museum strategies and programmes defines a new role for visitors and provides them with a completely new view of the museum sector. By participating at this fundamental level, visitors develop a sense of responsibility for museums as publicly funded institutions. However, such a deep involvement of the public comes at a price: museums have to share some of their authority with their public and in the process have to adjust their self-perception. Such a realignment may well require new infrastructures in museums as well as new staff positions with specific qualifications.

Tinkering and the maker culture

Tinkering refers to the process of assembling and mending objects in a playful way and combining this with exploring phenomena. Tinkering is also characterised by a low-tech approach, using cheap materials such as cardboard and glue, but which can be augmented with high-tech elements such as sensors (Gutwill et al. 2015, 152). The maker movement celebrates the practice of do-it-yourself. Maker culture is characterised by two features that can also be relevant for museums. The basic credo is "do-it-yourself"; in addition, however, the community aspect also plays a role, as the actors develop new communal forms of innovation, prototyping and manufacturing. Maker culture manifests itself locally in shared spaces called makerspaces. In these places, which are open to all, the practice of do-it-yourself is developed collectively (Gutwill et al. 2015, 152). They include fablabs, hackerspaces, open workshops and repair cafés. This playful and self-determined approach has been particularly successful in informal educational settings, including libraries and museums. It should be emphasised that "making" here mostly refers to phenomena and content from mathematics, informatics, natural science and technology, the so-called MINT subjects (Papavlasopoulou et al. 2017, 58). Even if the links to other disciplinary approaches are not so

obvious, there is an enormous, as yet unexploited potential here to transfer the making approach to other museum genres.

Making is attractive for museums not only because it gives established institutions a modern touch. It is also an important addition to their educational provision, as it combines craft practice with the scientific principles behind the respective museum to create an action-based approach (Gutwill et al. 2015, 162). Makerspaces in museums are places that function in a way that is decoupled from everyday routines and activities and where visitors can test and develop projects and ideas together. In contrast to formal educational contexts, the focus here is usually on the process of learning rather than the outcome (Brahms and Crowley 2016, 14–15). In particular, these activities can embed the data and materials held in the museum in new contexts of meaning through the practice of doing it yourself, enable new kinds of learning and reach a new target group as regular visitors to museums. Making and tinkering are fundamentally different from traditional ways of communicating in museums. In the process of making, there is no signage giving information about the background and meaning of an object (Lyons et al. 2015, 49). In order to establish tinkering as a successful learning situation, the feedback from the activities needs to be timely. This feedback, which is not necessarily on an individual basis, is a hallmark of participatory maker culture and distinguishes it from learning situations in exhibitions (Lyons et al. 2015, 51). Successful maker spaces in museums are characterised by a clearly defined framework and are often also staffed, while completely open workspaces usually lead to less successful learning situations (Lyons et al. 2015, 57).

Obviously, such open workshops support the principle of a repair culture as well as that of sufficiency. Furthermore, makers can contribute to a sustainable economy because of their decentralised local production values. For example, 3D printers can be of great help in replenishing damaged collection items – at least for test purposes. Furthermore, in the practice of DIY, the user becomes the producer. This opens up a perspective on innovations that come from the users and which can therefore also be more sustainable than product innovations created by designers or engineers. Making is also ideally suited as a tool of ESD, as it places the self-determination of the learner at the centre. The didactics of making can thus be directly linked to the competence approach of ESD (Gutwill et al. 2015, 152).

10.4 From educational programmes to local activism

Participatory practice in museums can also contribute to change in local communities (Lyth et al. 2017, 13). As a site of interaction and exchange, museums can contribute to the formation of social capital and thus play a key role in local transformation processes (Errichiello and Micera 2018, 5). Participation in local and regional projects is also particularly appropriate because there the complex and global challenges of sustainability and future viability can be grasped and worked on in specific model situations (Rieckmann and Stoltenberg 2011, 124).

Object-based learning in local education networks

Museums can cooperate even more closely than they have before with other actors in formal and non-formal education. This includes not only all types of schools and higher education institutions, but also other research institutions and other providers of non-school education. In addition, collaboration with community centres, technology companies and other actors in the media and creative industries is possible. In this way, museums can themselves initiate the formation of regional educational ecosystems and take on a very specific role within them. They can make the subject matter and educational programmes of the other actors tangible through objects and establish a stronger connection to reality. Such object-based learning focuses the educational provision in museums on collection objects as tangible evidence of history, culture and the realities of life (Sabiescu and Charatzopoulou 2018, 337).

However, museum education can also contribute to sustainable development beyond the education sector itself. Tackling complex problems often requires joint decision-making and therefore collaborative skills (Rieckmann and Stoltenberg 2011, 128). ESD in museums enhances people's ability to engage in participation and decision-making processes in society. Experiencing participation in this way can also have a motivating and inspiring effect on the democratic process (Rieckmann and Stoltenberg 2011, 126). The integration of deliberative methods in education and outreach encourages participants to express their own views and values and enables them to adopt a new perspective. Social learning methods include discussions, learning groups and debates.

Initiating practical projects

Museums, especially within the framework of their specialist expertise, could outline development paths that address current challenges and implement practical activities that contribute to greater social justice and sustainability at the local level. There are numerous starting points for this. For example, museums can become active in care work (see Morse 2021) and seek to establish links with local community initiatives. Museums can also become actors in decision-making processes and contribute to a deliberative democratic culture. To give a very specific example, a transport museum could set up a carpooling website and work with the local authority to set up carpool lanes or dedicated parking spaces for carpool vehicles.

Volunteer programmes are another way of implementing applied projects. They have the additional benefit of improving communication within the local community, creating new networks and thus contributing to overall societal sustainability (Edwards 2007, 171).

When working with local communities and disadvantaged groups, it is important to consider how exactly they are involved or what role they play in collaborations. Often, these stakeholders can be seen merely as beneficiaries of the museum's generosity. Instead, a partnership between equals should be sought that assumes a mutuality of learning (Janes and Sandell 2019, 12).

Good practice

Local cooperation supporting community museum learning

Hugo Gunckel School Museum, Chile

The Rural School of La Aguada is located in a sector to the southeast of the commune of Corral, Chile, whose population increased significantly at the beginning of the 20th century with the installation of the steel company Altos Hornos, the first in South America. Among other impacts, the company took up space from the hills, destroying a part of the native forest – to be used as fuel – followed by the forestry industry further degrading and polluting the soil and the coastal edge.

Aware of this history, as early as the 1980s, the students and teachers of La Aguada together established research methodologies to document, record and archive every object. And so, collections of vertebrates, invertebrates, flora, fauna and cultural objects, along with green brigades and science clubs were created, without even imagining the museographic value it would all turn out to have.

In 2010, the Hugo Gunckel School Museum was inaugurated; thanks to the collaborative effort of teachers and students, the Institute of Zoology of the Faculty of Sciences of Universidad Austral de Chile, and the Regional Government of the Los Ríos Region, that financed the development of the exhibition and the enhancement of the community's heritage.

The museum plays a fundamental role in the learning process. To begin with, museum activities and functions allow and promote the children's interaction with objects; getting to know them, interpreting them and giving them meaning based on their own experiences and interpretations. Each of the objects exhibited in the museum fulfils a pedagogical role, both for the educator and the children who make up the school community of La Aguada. In this learning process, complex cognitive dynamics are carried out, which do not necessarily relate to the contents and formal plans of the educational system. Thus, the museum becomes a space that actually adds value to the training process, integrating – in a creative and situated way – dynamics that contribute to the development of critical thinking and understanding of the environment in which the children develop.

From the point of view of applied museology, the role played by students and teachers at the Rural School of La Aguada is fundamental to preserve and project a balanced biological diversity in the territory, actively contributing to improving the community's quality of life, based on respect, collaboration and reciprocity.

Contributed by
Karin Weil G.

Cooperating with sustainability initiatives

Museums can also become active in local transformation and sustainability initiatives. An example of this is Local Agenda 21, which aims to anchor sustainability at the local level and to initiate a formal process within public administration. It is important to find out what role museums can play in Local Agenda 21 processes and how they can make a concrete contribution to sustainable development in their communities. Children and young people play a special role here as stakeholders, as they can often enrich the process with their own very specific perspectives (Rieckmann and Stoltenberg 2011, 128). Museums can also benefit from linking up with the many different initiatives that are locally organised, often from the bottom up. These include civic movements (such as the Transition Town movement), SDG meetings, or NGOs and charities in general. In such local transition processes, museums can take on two functions in particular. They can reach out to many actors through open and participatory activities and integrate them into the process; in addition, they can play and evaluation and advisory function via a scientific body (Errichiello and Micera 2018, 18).

Agenda 21 for Culture is an approach designed to help municipalities and cities think about and understand culture as a cornerstone of local sustainable development. A local cultural strategy, for example, can be developed to make the effects of local cultural activities visible and to promote and support them in the interests of sustainable development. It is also possible to adopt a charter of cultural rights and duties or to establish a cultural council linked to the public administration. For other actors from cultural policy, cultural studies, cultural industries and cultural education, this concept offers an accessible introduction to a practical engagement with the topic of sustainability (United Cities and Local Governments 2004, 4).

Museums can also foster sustainable innovation in local networks by using their collections as a resource and by involving the public in the innovation process (Errichiello and Micera 2018, 6). Opportunities for participation and the general involvement of citizens as well as multi-stakeholder partnerships can be particularly effective in contributing to the success of innovation. Museums have a special role to play in these networks, as they have a good reputation in terms of the knowledge they generate and communicate (Errichiello and Micera 2018, 18).

Extending and developing the links to sustainable tourism

Museums can also be seen as part of a comprehensive regional strategy for sustainable development (see Sacco et al. 2009) which includes regional economic cycles and, especially, sustainable tourism (Gustafsson and Ijla 2017, 2). Here, sustainability could serve as a cornerstone of regional cooperation between culture and tourism.

When museums perceive the tourism sector and tourism stakeholders as partners for sustainable regional development, a number of potential joint

activities quickly become apparent. Both approaches are linked by a focus on positive benefits for the local population in general and on economic effects in particular. Especially in countries of the Global South, the economic impact of cultural tourism and museums cannot be overstated, because this can also finance the protection and conservation of cultural heritage. Museums thus contribute to improved living conditions and to a prospect of sustainable development at the regional level (Perera 2015, 4). The impact of museums on the local economy is so important that museums can make a significant contribution to the standard of living and well-being of local people and visitors (Ajake et al. 2016, 123).

The participatory involvement of diverse stakeholders is a characteristic feature of the sustainable museum, just as it is of sustainable tourism. In concrete terms, this means, for example, recognising identical target groups and developing tourism products, activities and services for them in the museum in cooperation with local communities and other tourism stakeholders.

Toolbox

Sustainable practice | Education and participation

1 Specifically addressing ESD sub-competences in education and outreach programmes.
2 Integrating participatory approaches into all museum tasks.
3 Setting up a makerspace or a co-creation lab.
4 Carrying out applied projects to further sustainability at the local level outside the museum.
5 Establishing and consolidating cooperation with local organisations, activists and groups on sustainability.

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Part III

Putting sustainability into practice

11 Sustainability in museums as a process of change

In order to put sustainability into practice in the museum, it is not enough to implement within the museum's various departments the ideas and activities outlined in Part II. Rather, an overarching orientation framework is needed (see Figure 11.1).

For this purpose, the following section sets out an approach called "Sustainability Management in Museums", or SMM for short. This detailed approach can be used to improve the sustainability performance of museums and other cultural institutions, such as art repositories, visitor centres and science centres.

11.1 Sustainability management in the museum

> Sustainability Management in Museums is a tool for planning, improving and managing the activities of the museum and its impact on sustainable development.

SMM is a tool inspired by the concept of corporate social responsibility (CSR) and corporate sustainability management, but tailored to the specific contexts and needs of museums and cultural institutions.

Determining goals and scope

To contribute to sustainable development, SMM focuses on goals that are both overarching and at the same time specific to museums (Davies and Wilkinson 2008). SMM is deliberately not aligned with the SDGs, as they address global challenges and cover a very broad range of issues (vgl. Kap.3.3). In contrast, an alternative approach is taken here. Instead of defining the contribution of museums to sustainable development from a top-down perspective with reference to the UN and the Sustainable Development

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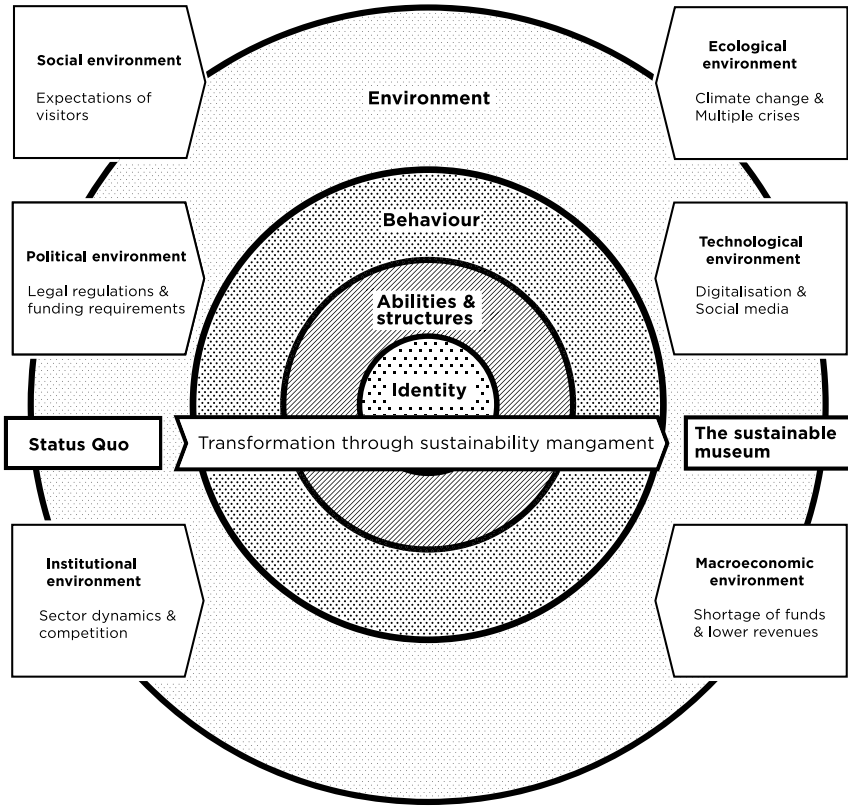

Figure 11.1 Transformation to a sustainable museum.

Source: Based on Dits 1996.

Goals, a bottom-up approach is considered more feasible. This starts from the perspective of museums and defines their contribution to sustainable development on the basis of their specific context and strengths as unique institutions.

SMM is a broad approach that can be adapted to the specific situation of each institution. The fields of action of sustainability management for museums can be categorised according to the doughnut model (vgl. Kap.2.2). This model can serve as an orientation framework to identify the interfaces between sustainability and museum operations and as a starting point for the implementation of sustainability management. The corresponding fields of action can also be useful for structuring the tasks required to improve sustainability performance.

SMM should not necessarily be seen as an approach that will solve all potential sustainability challenges. Even if this might be possible, it should be seen primarily as a tool to address individual issues and to support first steps towards incremental improvement. Sustainability is a comprehensive challenge for all institutions, not only for museums. Sustainability should not be

seen as an additional task within the list of defined goals and the museum's self-image, but as a cross-cutting task that should ideally be integrated into everyday museum life.

Integrating sustainability into everyday museum life

In order to integrate sustainability in museums, the abstract concept of sustainability and its doughnut model must be related to the daily routine. How can sustainability management be integrated into museum operations in practical terms?

There are two possible approaches here. Firstly, the dimensions of the doughnut model can be used as a structuring principle for sustainability management. Sustainability management is then divided into the following areas: programmatic, economic, social and ecological. Their relevance for a sustainable future is obvious, and concrete measures in these areas are easily identifiable. However, it can be a challenge to integrate measures designed in this way practically into daily work. In museums, implementation can be simplified if, alternatively, sustainability management is structured according to the different departments within a museum. These departments usually reflect the institution's mission. Furthermore, they represent a structure that is familiar to all employees.

In the previous section of this book, the links to the idea of sustainability in each area of museum operation were discussed. This clearly showed that sustainability is important for almost all areas of museum operations. However, activities aimed at directly increasing sustainability usually affect several departments and are thus a cross-cutting task for museum operations. The responsibilities and tasks of sustainability management within an organisation are cross-departmental. Implementing sustainability management means taking an integrated approach rather than creating a new department alongside existing departments.

Managing change successfully

The transformation to a sustainable museum is not just about drawing up a carbon footprint, but is more like a fundamental cultural shift within the museum. The transformation describes the transition from the institution of the museum as it was to the future vision of a sustainable museum. The following section is largely based on Darren Peacock's insightful analyses and practical experience (2008, 2013). This transformation brings about change at various levels. At the institutional level, the vision or mission of the museum changes. Following on from this, strategic orientations are reviewed and internal structures and processes adapted accordingly. On a social level, new group dynamics are initiated. The transformation process as a whole is also characterised by conflicts and by resistance from individual actors. On an individual level, the transformation is accompanied by a change in personal perceptions. Values and the professional orientation framework are realigned in the course of the process.

Human resistance to change can hinder institutional change processes. This is especially true of sustainability management, which is seen by some as a hopeless task. Furthermore, the broad concept of sustainability touches almost every aspect of the museum sector, and this can be perceived as overwhelming. Precisely for this reason, sustainability management is a useful tool for overcoming this feeling of being overwhelmed. Its clear structure helps in taking one step at a time towards a more sustainable future in a practical way. The effectiveness and efficiency of sustainability management can be increased with the help of change management approaches and tools.

Change of this kind must take into account that museums are complex, dynamic social entities over which complete control is impossible. It is against this background that the approaches proposed here should be framed and understood (Peacock 2013, 237). As already explained, the complexity of global sustainability problems brings the importance of uncertainty into focus. Against this background, security and control are an illusion. Contemporary organisations and their structures should reflect these insights. Every process of organisational change is more or less chaotic and replete with paradoxes, and takes place along a non-linear trajectory (Peacock 2008, 340–342). For this reason, SMM also corresponds to the understanding of emergent change. Emergent change arises in a decentralised way at the grassroots level and evolves through the interaction between individuals. The start of organisational change is when patterns of interaction and narratives within the museum begin to shift (Peacock 2008, 337–339). Management of emergent change focuses on enabling change by fostering an open culture of conversation, creating different opportunities for communication on controversial issues and a rich diversity of people and ideas, and utilising networks to open the museum to the outside world and integrate new ideas and approaches (Peacock 2008, 347–348). In order for a change process to be successful in the long term, what is needed above all is a change in the communication culture throughout the organisation. An open and reflective communication culture that is open to the outside while inwardly focused and with minimal hierarchy can be the crystallisation point for behavioural changes at the individual level and thus for successful change management in the long term (Peacock 2013, 238). At the heart of a communication culture that functions as a foundation for change is complexity and the acceptance of the fact that museums, their tasks, relationships and organisational dynamics, are complex and uncertain. Accepting this is a good basis for cultivating a communication culture that drives real change (Peacock 2013, 243).

The integration of the care approach into museum work can also enrich the new organisational culture. Institutions that reinforce the importance of care work are characterised by flat hierarchies (Morse 2021, 194). In this sense, care can also be understood as a starting point for organisational change in museums, as it focuses on interpersonal relationships in all their complexity.

Process and instruments

SMM follows a process consisting of seven steps or phases. This process is similar to other typical management or planning processes. The process for implementing sustainability management encompasses (see Figure 11.2):

1 supporting emergent change and encouraging bottom-up participation,
2 launch and empowerment,
3 goals, strategies and indicators,
4 status quo analysis,
5 measures,
6 implementation and monitoring,
7 communication and reporting.

The process of change in museums often begins with grassroots activities by staff. It is important to support this emergent change and to strengthen it through a broad participatory process.

In order to initiate a process of change, it is essential that the senior management commits to leading its institution in line with the principles of sustainable development. This also serves to communicate the values associated with the sustainable museum and commits the management to value-based leadership. This commitment should be put in writing and binding. The aim of this launch phase is to develop a rough mission statement with brief guidelines for the institution.

From this starting position, the fields of action relevant to sustainability in the museum are then identified using both a top-down and a bottom-up approach. Strategic goals are then developed for all fields of action. Indicators are then defined for these fields of action (e.g. energy costs, paper consumption or job satisfaction).

The basis for every initiative to improve sustainability performance is a status quo analysis. At the end of the analysis, the current state (baseline) of the selected indicators is determined. The analysis is a comprehensive inventory of how the museum is currently operating. Such an inventory is the basis for the subsequent change process. Based on the results, the impact of the sustainability management measures can be evaluated.

Building on the goals, the indicators and the status quo analysis, specific measures are then determined, in a broad-based participatory process. A core document of the entire management process is the compilation of a sustainability programme. This contains all the activities necessary to achieve the previously defined goals. For example, possible measures for achieving the goal of reducing paper consumption – such as the installation of hand dryers in the toilets, or the introduction of digital forms for internal communications.

In the implementation phase, the activities of the sustainability programme are put into practice. Employees are continuously involved in this process

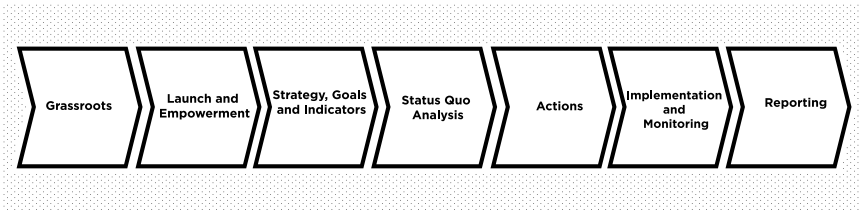

Figure 11.2 Phases of sustainability management in the museum.

through various participation mechanisms. In order to assess progress towards the achievement of targets and the improvement of sustainability performance, monitoring against baseline data is required. To keep the workload of the process as low as possible, it makes sense to integrate the collection of relevant data into existing workflows.

Regular communications about the entire sustainability management process play a key role in ensuring employee engagement and long-term success. The museum should regularly communicate key information about its economic, environmental and social impacts, goals and actions. This can involve a standardised reporting system, where appropriate, to make its strategy and progress towards achieving its goals transparent both internally and externally. The outcomes and progress of the process should be made public. Internal communication serves primarily to manage improvement processes within the institution. The preparation of a sustainability report for external stakeholders can be of major importance for the reputation of the institution.

Phases 3 and 5 to 7 of this process can be repeated over time, as sustainability management is a dynamic and long-term process. So once sustainability management has been introduced, a circular process begins (see Figure 11.3). This process starts with monitoring, possibly followed by an adjustment to the sustainability programme objectives. The measures identified are implemented in accordance with the sustainability programme, and finally the process is shared again, for example in the form of a new sustainability report.

For long-term successful sustainability management, documentation of the process that is tailored to the individual museum is necessary. At the end of the first implementation phase, process descriptions, instructions and templates are collected in order to provide a foundation for further work and future improvements. Such documentation does not necessarily have to be in the form of a manual. A graphically attractive website may be appropriate, initially only depicting the general process and making detailed instructions and templates available at deeper levels. A record of this kind can also have a motivating effect for further work and make it easier for new team members to get involved in the process. How elaborate and comprehensive such documentation needs to be depends mainly on the procedures within the museum and their complexity.

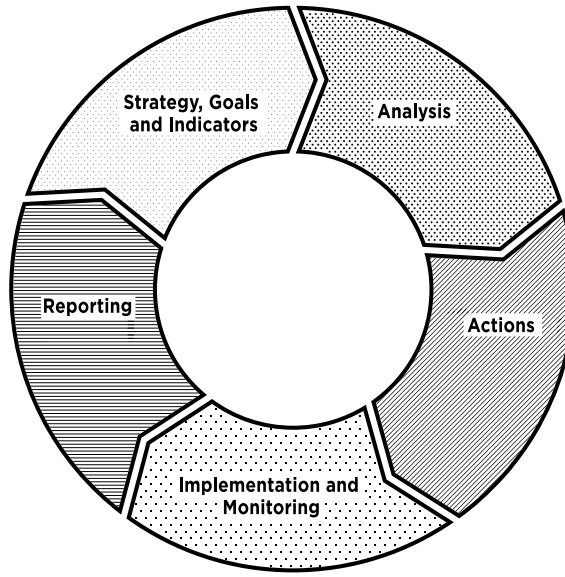

Figure 11.3 Sustainability management in the museum as a circular process.

Taking into account the factors for successful change processes

Designing transformation processes for museums can benefit from many years of change management experience in other sectors. In particular, very specific factors can be identified that make a successful change process more likely.

A successful change process creates a sense of urgency. Often this is ignored because the general tendency to inertia and comfort is underestimated and the potential for change is overestimated. For successful change, it is not enough to have the support of the management board. A strong leadership coalition will include also heads of departments as well as other staff. This coalition must be sufficiently strong in terms of formal titles, expertise and networks to overcome the tremendous inertia of museum structures. Although a change process can initially be successful even without a strong leadership coalition, over time the necessary behavioural changes usually do not happen and the influence of the tendency to inertia prevails. A good vision is also of crucial importance for a transformation of the museum. The vision inspires employees and helps them to deal with the process constructively and to change their individual behaviour. A good vision avoids overcomplication and excessive vagueness; instead, it is concise and specific and offers points of entry to a wide range of stakeholders. If people in key positions in the organisation block change, then a single person can jeopardise the entire process. The key here is to identify and involve such potential blockers at an early stage and to let them contribute to shaping the change. For a change to be successfully established in the long term, it is not enough for employees to change their behaviour, because new behaviours will always also be questioned in the future

when the urgency and pressure for change diminish. Long-term change will only be achieved when the new behaviours have become part of the social norms and values of the institution. Until change is also embedded in the culture of the institution, the goals achieved will always remain fragile and things can quickly regress to their pre-transformation state.

The key success factors must be taken into account particularly during the initial phase of sustainability management. Successful changes in institutions are characterised by broad acceptance across all departments and hierarchical strata. It is crucial for increasing acceptance that employees are motivated to support the introduction of sustainability management. This is usually achieved through broad bottom-up participation.

Good practice

Achieving sustainability through organisational change

We The Curious, United Kingdom

The science centre "We The Curious" has been working on sustainability since 2011. Thus, its pioneering approach to sustainability has grown beyond its own organisation, to see it become a leader in Bristol's climate emergency movement and an exemplar for the sector. We The Curious recognised early on that achieving sustainability success would require both organisational change, ensuring all staff can understand and participate in the journey, and a clear framework that translates complex sustainability challenges into simple and progressive steps.

The first stage of this process was to embed sustainability in the organisation's vision document, the Manifesto, and to appoint a Head of Sustainable Futures, a member of the Leadership Team whose role is to create a sustainability programme and framework. The Head of Sustainable Futures is supported by the Sustainable Futures Team, a group consisting of representatives from every department, whose remit is to ensure all staff and activities of the organisation are included in We The Curious' commitment to sustainability. The Sustainable Futures Team deliver actions across the whole organisation, monitor performance, and help departments navigate their unique sustainability challenges. Communication with all staff is pivotal; providing clarity, celebrating success but also running "taboo" sessions where difficult sustainability issues can be openly debated and solutions agreed.

This cross-organisational commitment is essential for the innovative way that We The Curious delivers its sustainability pledges. We The Curious pledges to "Do" (operational sustainability), "Talk" (public engagement on sustainability topics) and "Share" (sustainability partnerships with communities, the city and sector). Cross-linking these areas brings benefits, for example: technologies used to improve operational sustainability also feature in public programmes, sustainability

solutions developed are shared with other science centre, and sustainability partnerships with the city provide unique access to expertise and resources. Staff are invited to suggest sustainability projects themselves, working within the "3 × 6 Campaign" framework that identifies 18 annual projects, with three levels of ambition across six areas: energy, water, procurement, waste, travel and biodiversity. This combination of staff participation and fresh targets ensures that enthusiasm remains high, while the core mission of improving environmental sustainability remains consistent throughout.

We The Curious have been on the journey towards environmental sustainability for ten years, delivering multiple projects that include reducing energy consumption by 30%, becoming the first science centre in England to achieve Gold Green Tourism status and running public programmes and behaviour change campaigns. The current focus is on a pathway to become carbon neutral by 2030 and future efforts will move from climate mitigation to climate adaption.

Contributed by
Chris Dunford

11.2 Emergent change and participation

If sustainability management not only focuses on improving sustainability performance but actually takes the concept of sustainability seriously, it will also adhere to the core principles of sustainability as they apply to processes, cooperation and communication. Sustainability and the process of change leading to it is agreement-based at its core. This means that sustainability management in museums must be radically participatory. This also makes it clear that it should initially be thought of neither as a top-down nor a bottom-up process, but as a broad participatory process at all hierarchical levels. Nevertheless, both approaches can be used in its implementation.

It should be borne in mind that an approach based exclusively on bottom-up initiatives and processes will only be successful in very small museums (Aguinis and Glavas 2019, 1079). Sustainability management as an exclusively bottom-up process will in most cases not reach the senior management level and will not lead to a structural transformation. SMM therefore combines a top-down approach with a bottom-up approach. In a top-down process, the senior management champions the change project. In a bottom-up process, self-organising clusters within the institution can be supported, and the implementation of micro-measures is the initial focus. The combination of both approaches means that the senior management level is involved as well as all employees and various interest groups within the museum, and the process can be further developed in a counter-current manner.

Thus, the opening phase of sustainability management is always accompanied by the start of a broad participatory process. The depth of this participatory process and the tools used differ in each of the seven phases (see below) of the management cycle. For this purpose, change management approaches are applied to the museum sector, and the following section is largely based on recommendations on participation by Lauer (2014).

Enabling continuous participation

From the beginning, there should be clear communication about the structure of the participation process, who can take part in it and what influence participation will have on the overall process. For example, the museum management should not set the broad objectives in advance leaving only the detailed implementation to take place through participatory dialogue. Rather, the aim should be a process in which all employees are involved from the beginning, even at the level of targets and operational areas of change. In principle, everyone in the museum should be able to join in the participatory process; however, the practical constraints on implementation mean that this will only be possible in small museums. The circle of participants as well as their influence can also vary between operational fields and phases. This participation plan, which shows who will be involved, when and to what extent, should be made clear to everyone at the very start of the process (Lauer 2014, 148–149).

Participation is not only necessary to bring about and promote institutional change, but also to maintain it. Participation in SMM is therefore not a short-term approach, but an inherent part of long-term change. In order to achieve such durable change, a participatory approach is needed which not only harnesses insights from past practice for planning future activities, but which is more future-oriented and develops the approach for SMM from this (see Scharmer 2009, 51).

For the successful implementation of mechanisms and methods of participation, experience and practice-oriented training in this area are needed, and this need is usually underestimated within the museum. External support should therefore be planned in to support this process. If necessary, it can be useful to arrange for initial training for staff members who can then accompany the permanent participation process in the future (Lauer 2014, 150).

Communicating change within the museum

Internal communication during the change process informs and guides the participatory process and is modelled on change communication approaches. This process aims to create awareness of the problem, to convince employees of the meaningfulness and effectiveness of sustainability management and to generate a sense of ownership of the change.

Internal communication follows three steps: analysis, planning and implementation. The analysis phase involves clarifying the initial situation as well

as the ongoing reasons for the change and any special challenges. In this step, the target groups for internal communication are also identified and their role in the change process analysed. This enables the identification of the goals for internal communication. The planning phase essentially covers the creation of an internal communication strategy as well as a "sustainability change story". The communication strategy is based on the phases of sustainability management and identifies specific tools for specific events and target groups. The media and channels to be used are also identified. The implementation of the planned communication strategy also includes the integration of feedback and adaptation to the progress of the process.

Even in small to medium-sized museums, this process – which might appear daunting in scope – should be carried out at least in rudimentary form. In the analysis and planning phases, obstacles to participation and possible areas of conflict can often be identified and tackled in advance.

Identifying levels of communication and benefits

The different communication situations in museums must also be taken into account when introducing sustainability management. Internal communication as well as communication with stakeholders should be carried out in an engaged and respectful way. It is characterised by dialogue, involvement and participation. Furthermore, communication should be characterised by an exchange of values, understood as a co-creative process of creating a collective sense of purpose for the museum (Jarolimek and Weder 2017, 120). Communication can take place at different institutional levels of the museum. At the senior management level, strategic considerations play a role, while at the departmental level, specific issues and problems predominate. The different focus in communication at the different levels is achieved through an integrated communication strategy. This enables goals, messages and tools to be aligned and at the same time adapted to the different hierarchical levels. This structuring is not to be understood as a means of prescribing content or messages, but rather serves as a guideline that avoids contradictory communication content at the individual hierarchy levels (Bruhn and Zimmermann 2017, 11).

In addition to more formal tools such as newsletters, circulars and the use of the intranet, communication can also be carried out using small-scale communication tools that are better integrated into social exchange at the workplace. These include messenger groups, bulletin boards and notices, and microblogging.

However, a grassroots movement relies especially on communication from the bottom up, i.e. from the employees to the management level. This is particularly relevant if the overall process is initiated by employees or if the emergent element of change is predominant in the overall process. It can be helpful in this context to adapt the understanding of sustainability to the individual goals of the management or to make it compatible with them. For the practical implementation of an initial measure or proof of concept, it can be helpful to make proposals for process optimisation that are as specific as

possible and supported by data. Some aspects of sustainability management are particularly suitable for communication with the senior management level. These include pointing out cost savings and ways to measure and improve the impact of individual activities or of the museum as a whole. In addition, the opportunities that arise for external communication through certifications or awards can be brought to the fore.

Among colleagues on the same hierarchical level, aspects are often brought up that are avoided in vertical communication (whether up-down or down-up). Using this level of communication for the change process is therefore not simply helpful; this level in fact represents the core of the change in workplace culture. The easiest way to bring about a change in workplace culture is through a general and informal conversation – about sustainability, and possible challenges and solutions. Storytelling and visualisation using illustrative examples help many people who previously had no connection to this topic to relate this daunting task to their everyday lives. As a general rule, conversations about sustainability and change should not be characterised by negative developments and scenarios. Leading by example in the course of everyday work will have more impact than criticising others and giving them instructions for their behaviour in an intrusive way. Criticising or shaming people for their personal behaviour demotivates them and drives them into a defensive posture. A positive atmosphere that focuses on potential benefits should therefore characterise the way people deal with the issue. A common pitfall in sustainability communication is referring to problems that are too distant in space or time. The classic example of this is climate change (vgl. Kap.4.3). Successful communication therefore suggests links to the actual problems and challenges of everyday museum life, and is site-specific and local. Another common challenge is that the issue is perceived as so overwhelming that resignation and passivity set in. The perception that an individual's contribution to the solution would be far too small can be countered above all by appealing to a sense of community. In summary, communication should be less problem-oriented and more solution-oriented instead.

Such positive and opportunity-focused internal communication provides answers to the "why" question – because every employee will inevitably ask themselves why they should support the arduous process of change. What are the benefits of sustainability management? Five main benefits can be obtained through the introduction of sustainability management.

Toolbox

Method | Open participation

An "open space" can be used as a basic participation format for every step of sustainability management. An open space is an open participation format that allows a great deal of freedom and thus encourages commitment from the participants. It involves very few framework

conditions: following a specified period of time, outcomes must be produced and documented. The time required for an open space depends on the predetermined goal (Owen 2008, 44). "Open spaces" thus follow a bottom-up understanding of leadership and are suitable especially (but not only) for participation in which employees have a high degree of creative freedom. A typical open space process is divided into the following steps (Lauer 2014, 158):

- gathering topics from the whole group,
- autonomous assignment of participants to topics with the aim of forming working groups,
- work phase on the respective topics in the groups, with subsequent documentation,
- the findings from all the groups are made available and serve as a basis for further work or decisions.

Especially in larger museums, "open space technology" can be employed in several iterations and thus bring about a self-organising process.

11.3 Actors, roles and positions

Sustainability and the transformation of museums towards sustainability is an HR-intensive process, especially because it is agreement-based and relies on broad participation. The following description of the relevant roles and tasks is largely based on Braun (2010) and has been transposed to the museum field.

Ideally, sustainability management in a large museum consists of a senior staff position with primary responsibility for sustainability and a sustainability team that coordinates cross-departmental tasks. At the same time, it must be ensured that sustainability management is embedded both within the management board level and in the individual departments. The actors involved and their tasks are shown in the following table and are described in more detail below.

Position	*Role*
Museum Director	• Role model function based on authenticity • Deciding on scope and objective of SMM • Taking the lead on relevant issues in the supervisory body • Integrating sustainability into the museum strategy
Governing board	• Addressing the aspects of sustainability identified as material • Consideration of sustainability aspects in decision-making

(*Continued*)

Position	*Role*
Sustainability team	• Managing internal communication and participation • Drawing up recommendations for senior management and the supervisory body • Decisions on sustainability management measures and individual projects
Head of sustainability	• Coordination and monitoring of the overall process • Resolving obstacles and conflicting goals • Implementation or support of sustainability management projects • Close cooperation with senior management
Contact persons in individual departments	• Development and implementation of measures • Collection and delivery of information and data • Advice and collaboration on the overall process
(External) Change consultant	• Support and qualification of head of sustainability • Supervising process, internal communication and conflicts • Imparting eta-level knowledge and methods

Source: adapted from (Loew and Braun 2006, 33).

The director as role model

The museum director communicates a comprehensible rationale and attractive vision for change and shows how this is consistent with the museum's mission. It also acts as a role model and exemplifies the change in its own behaviour. To facilitate implementation, it enlists other key museum leaders in the process and ensures that resources for SMM are in place. This means, in particular, time resources for staff and for training and, if necessary, additional funding for the further implementation of SMM (Smith 2015, 52).

The role of the governing board, or of any similar body, in sustainability management is determined principally by the results of a materiality analysis (vgl. Kap.12.2). Any specific issues identified there as important for the museum and its operation fall within the remit of the governing board. The board must at least address these issues and review any changes related to them (Braun et al. 2010, 16). For larger museums or museum groups, the role of senior management in the organisational structure is also relevant. The introduction of sustainability management will only be successful if it is also supported at this level (Loew et al. 2019, 11). In addition to the internal perception that the topic is a top priority, the working culture, as exemplified by the senior management, and the associated understanding of the role sustainability plays in achieving the museum's tasks, is also an essential criterion for success. Depending on the focus of the desired changes, it may also be expedient to assign the responsibility to individual departmental managers, e.g. facility management.

It is crucial for the initiation of successful sustainability management that implementation is primarily coordinated from a single central location and supported by external advice.

The sustainability team as a key actor

A sign of emergent change processes is often that interested staff members join together in a working group – either before or after a launch event. This working group can then be mandated by the leadership to plan and shape the process further.

This working group can then be built up into a sustainability team which includes representatives from all departments, in keeping with the cross-cutting nature of the task. This steering group will coordinate the process and serve as an interface between management and the rest of the staff (Loew et al. 2019, 11). The members of the sustainability team are the best-informed employees from within a small organisational unit or department, and are the contact persons for questions, suggestions and feedback with respect to the sustainability management process. The members of the sustainability team inform colleagues in their working environment about the status and progress of sustainability management and report back to the team and the head of sustainability on the mood, progress achieved and ideas emerging within their own department. They thus act as mediators between these two actor levels. The key tasks of sustainability management, such as the formulation of goals, the preparation of the sustainability programme, and monitoring, can be taken on by the sustainability team, which is embedded in the participatory process. The decision-making powers of the team are key to defining its role. It can either act only in a preparatory and advisory capacity and thus support decisions, or it can be given decision-making powers and budgetary responsibility in order to be able to drive the process forward more independently. In order to avoid conflicts of authority, it is important to ensure that the decision-making powers of existing departments and operational units that already deal with individual sustainability issues are not encroached upon (Braun et al. 2010, 17).

Setting up a sustainability team as a steering group only makes sense if the museum exceeds a given size and direct communication would therefore be difficult. In small and medium-sized museums, the creation of a sustainability team often does not make sense. There, sustainability management should be located directly within the senior management level. A head of sustainability may be appointed to support the implementation of the process.

The head of sustainability as pilot of the process

The sustainability team is led by a head of sustainability. It is advisable to create a staff position for this purpose.

Creating a new staff position is often not supported or even blocked by other departments. As a rule, however, there is no alternative, because splitting tasks between different departments means that there is no central person who gathers all the relevant information, who is the contact person on this issue both internally and externally and who drives the process forward independently of others in the museum. A head of sustainability acts as an

ambassador for the idea of sustainability – both internally and externally. They embody in a unique way the museum's moral sense of direction and the museum's accountability towards society with regard to global challenges. In addition, they also represent change in museums and act as a prototypical change agent, proactively and constructively shaping change in the institution (Dörr 2020, 51). In particular, the sustainability officer can ensure the integration of the different perspectives of the departments, and maintain the comprehensive overview needed for the development of new solutions, something that would be more difficult for individual departments for professional as well as political reasons. This is particularly important for large museums in order to bring together the different perspectives of the museum departments. The head of sustainability works with the sustainability team and the museum's senior management. They ensure the implementation of the agreed measures and are responsible, in cooperation with the departments, for the collection and processing of data. They are also responsible for internal reporting. Certification and the achievement of certain norms or management standards are also among their responsibilities. A core task is managing the internal communication and participation process, or supporting the sustainability team in these tasks (Braun et al. 2010, 17–18). The role of the head of sustainability can be summarised as follows:

- reporting directly to the museum's senior management,
- supervising all internal sustainability measures,
- being the contact person for all employees on sustainability issues,
- informing staff about progress,
- organising information management on the topic,
- responsible for sustainability reporting,
- being an ambassador for the guiding principles and values of sustainability,
- bringing together the divergent perspectives on sustainability and change.

The head of sustainability takes on a special role within the social system of the museum, bringing new questions, perspectives and requirements to the institution. The thinking and behaviour of a head of sustainability are therefore characterised by innovation. This applies to individual and technical measures as well as to procedures and interpersonal processes (Wühle 2019, 72–73). For the senior management level, the importance of the head of sustainability for the strategic development and management of the museum also increases as they gain experience and detailed knowledge of the key operational data. Here, they can be involved to the benefit of the entire museum and contribute valuable perspectives that can open up new pathways for development (Braun et al. 2010, 17–18).

This position can be filled by a newly recruited person or by appointing an existing employee. Unless a significant additional budget is available, it is unlikely that a new position for a head of sustainability can be created. The role must therefore often be filled from among the existing staff.

If the success of a change process depends above all on the extent to which employees get involved and how they are integrated into the overall process, then the communication skills of the head of sustainability are of particular importance. Empathy, being a good listener, taking concerns seriously and communicating with understanding are important characteristics of a successful head of sustainability (Wühle 2019, 73–74). A head of sustainability should have the following qualities and skills. They should be:

- well networked in various museum departments,
- a good communicator,
- an inspiring and motivating personality,
- with good contacts to supporters and fellow campaigners,
- and ideally with previous experience in the field of sustainability or sustainability management.

Implementation within departments and working groups

Where there is a middle management tier, made up of departmental heads for example, these people can be seen as the core of the institution and thus as essential actors in the change process. Embedding the process via staff within the different departments is particularly important for identifying practicable approaches and measures, testing prototypical changes and systematically preparing feedback on opportunities and obstacles to change that can be incorporated into the process (Smith 2015, 57). While a top-down approach is indispensable for the launch, this must be matched by bottom-up measures, because sustainability problems are usually already well known in the affected departments. This detailed knowledge of the departments must be made accessible for the overall process in the museum. In addition, the departments ensure the data collection and monitoring of SMM (Eisele 2021, 105). Departments have the following responsibilities within the framework of sustainability management:

- providing the necessary practical detail for the sustainability programme and measures,
- implementing and monitoring the measures,
- collecting data and entering it into the sustainability data system,
- monitoring targets and reporting to the sustainability team.

However, it is precisely at departmental level that hurdles to cooperation and difficulties in implementation often arise. The establishment of structures for sustainability management is often made more difficult by competition between different specialists at departmental level, who may squabble over internal authority with regard to sustainability issues or may see the information and reporting obligations as an illegitimate intrusion into their own area of responsibility. A head of sustainability needs a great deal of diplomatic tact here (Braun et al. 2010, 18).

Additional working groups can be set up, for specific departments, time-limited issues, work assignments or specific topics. A single working group might be set up within each department. The formation of such working groups can be initiated by the sustainability team or can also arise from the bottom up. Members can join groups on their own initiative or can be proposed by the sustainability team. In addition to the head of sustainability, other people responsible for specific special topics can also support SMM (Eisele 2021, 99).

Accessing external support

Support for the process from outside the museum can also prove fruitful. In general, external advice in the field of sustainability can help to shape the change process in a practical way. The transfer of knowledge and methods on a meta-level plays a central role here. Facilitation and methodological skills and tools are particularly important. Such advice can also be helpful in processes of reflection, adjustment and reorientation of the process. External advice can also be of help during critical phases of the change process. It can ensure that the process is not derailed by obstacles in general or by internal conflicts. Expert information can be used to develop a framework within which controversial issues can be negotiated in the museum in a productive and purposeful way. This is particularly helpful because of the possible conflicts of objectives that may arise, where emotions may also be involved. External advice based on experience from other projects can help in the assessment of results, and qualitative monitoring can provide another assessment method that can help in further development. External sustainability advice can above all also serve to increase the impact of the museum's work. Decision-making processes can be reviewed and optimised with a view to increasing impact (Braun et al. 2010, 27).

An external sustainability mentor could act as a coach for the head of sustainability. A sustainability mentor is an external person with sound knowledge of sustainability issues and of change processes. In addition, an external audit committee could ensure the quality of the strategic goals or of the sustainability programme as a whole. An external committee of this kind also increases the credibility of the whole process and could provide contacts for possible new funding opportunities.

Toolbox

Method | Inspiring colleagues

Five reasons for introducing sustainability management in museums

1 Taking responsibility and contributing to the solution of global challenges

   - ensuring through sustainability management that the museum contributes to meeting the challenges to society,

- utilising the potential of the museum to act as a multiplier in promoting sustainability,
- strengthening the museum's capacity to adopt sustainable practices.

2 Strategic management of improvements and changes

- using sustainability management as a vehicle for change management throughout the museum,
- systematically stimulating improvement and innovation processes through sustainability management,
- increasing the resilience and robustness of the museum.

3 Active reputation management

- positively influencing the institution's reputation internally and externally and increasing its credibility,
- using the results of sustainability management for a wide range of public relations work,
- using sustainability management to win awards and certifications.

4 Economic benefits

- ecological sustainability leads to lower resource and energy costs,
- social sustainability leads to increased productivity and better health among employees as well as better qualified applicants,
- economic sustainability leads to greater resilience and secure long-term funding.

5 The institution as a beacon

- making the museum a role model for the sector through sustainability management,
- using reporting to inspire and motivate other actors in the cultural sector.

11.4 Empowerment and meaningful work

The transformation to a sustainable museum also requires new thinking about what motivates employees to become involved and committed and to ultimately drive this process of change. The focus here, starting from reflections on motivation, is on the meaning or meaningfulness of the work and what role this plays in employees' commitment.

Traditional motivation theory focuses on factors such as personal utility, money, status, power, self-efficacy and self-actualisation. However,

focusing on these and similar categories and models of motivation is not very helpful in practice because they are often outdated, not empirically validated and so broad that they are not suitable for use in practice. In addition, a work culture and leadership style focused on satisfying these needs often promotes employee satisfaction and retention, but does not have a positive impact on work motivation (Becker 2019, 39–40). While traditional motivation theory can also be helpful for management in museums, in the context of sustainability management in particular a shift from the paradigm of motivation to a paradigm of meaningfulness seems appropriate.

From motivation to meaningful work

The motivational paradigm for the performance of work focuses on intrinsic motivation and personal satisfaction on the one hand and extrinsic motivation and different forms of rewards on the other. In contrast, the paradigm of meaning goes further: it focuses on the centrality of meaning in order to explain how people can create not only meaningful work experiences but also meaningful lives (Di Fabio 2017, 3). In a post-growth society, individual motives for work will also shift. Already, intrinsic motivations as opposed to monetary incentives are at the heart of any transformational leadership style. Value-based work environments can strengthen such intrinsic motivations in employees and create a collective climate of engagement (Fritz-Schubert 2021, 39). Here, the meaningfulness of work is conjoined with sustainability and a meaningful way of life. The paradigm of meaning can be seen as a key by means of which institutions like museums can combine sustainability, growth and success (see Di Fabio 2017, 3).

As the museum sector as a whole, as well as society at large, increasingly focuses on the idea of sustainability, sustainability management leads to the alignment of these external demands with the internal priorities of the museum. On an individual level, it also means that the values, intentions and goals of the individual employee are aligned with those around them. This is the best starting point for experiencing meaning in the workplace (Lysova et al. 2019, 385). Even for employees who do not intrinsically identify with the values of sustainable development, the new orientation of the museum now offers the opportunity and a starting point for establishing a congruence with their social environment and thus for carrying out work that is perceived more strongly than before as meaningful. In the complex field of sustainability in particular, creating meaning through work is a fluid and chaotic process, as successes often only become visible in the long term, social setbacks call one's own actions into question, and employees have to constantly re-define their role with regard to the demands of the various stakeholders (Mitra and Buzzanell 2017, 612). This should be taken into account through forgiving and flexible requirements for the implementation of sustainability management. In order to cushion this uncertainty, the informal formats

and participation mechanisms that serve to foster self-reassurance are particularly helpful (Aguinis and Glavas 2019, 1078).

A significant element in linking the motivational aspects with the meaning of the work is the creation of the sense of a collective group. A sense of belonging and social purpose lead to a high level of identification with the process and thus with the motivation to work for change (Rosso et al. 2010, 111–112).

In the course of the transformation process, the detailed design of the process plays a major role in the perception of meaningfulness. If employees can engage authentically in the transformation process, it has a positive effect. If one's own identity can be aligned with one's role in the process or tasks, then a feeling of authenticity is created and with it the sense of a contribution to meaningful work (Rosso et al. 2010, 108). This means that the process should allow sufficient creative leeway that employees can freely choose their tasks within it. This is why the complex instruments of participation described above are so important.

Empowering employees to adopt sustainable behaviour

Empowerment methods are another core element of support for the change process. Empowerment expands employees' scope for action and creative freedom. This means that employees have more control over and responsibility for their working environment. Furthermore, the contribution of the individual as well as the team is focused more closely on the overall success of the organisation. In addition, employees are encouraged to use opportunities for self-realisation and development (Niermeyer 2007, 140). In order to support employees in their responsibility, different measures on the individual as well as on the organisational level can be helpful. Measures at the organisational level include workplace (re)design and job description changes, transformational leadership, extensive training opportunities and promotion pathways. At the individual level, job satisfaction, periodic work-life balance audits and workshops on the topic contribute to empowerment (Schaufeli and Salanova 2010, 401–411). Empowerment in the context of sustainability management can also mean that employees at all levels are given responsibilities and resources to implement sub-components of the sustainability programme. Empowerment for sustainability not only increases the opportunities for personal development, but also the necessary sustainability skills. For this, employees can attend training on the aspects of sustainability relevant to their field of work, and they can also be coached by external experts such as a sustainability mentor (see Gutiérrez et al. 1995, 540).[1] Empowerment focuses on employees' strengths and aims to make optimal use of them for SMM.

A transformation of the museum and of society requires changes in both individual and collective behaviour. At the level of individual behaviour, employees can be supported in implementing behavioural changes. Different types and methods of intervention are possible. Interventions based on

empowerment and shared norms tend to be more effective than those based on persuasion and peer education. Empowerment involves the enhancement of psychological skills, motivations and opportunities to overcome obstacles in the work context. Overall, it is the intervention method that offers the greatest potential for shifting employees' behaviour in the direction of sustainability (Paillé 2020, 153). In addition to focusing on and enabling sustainable behaviours in the workplace, sustainability management also looks at counterproductive behaviours. Here, it is important to analyse the reasons that lead individual employees to engage in counterproductive, non-sustainable behaviour. Focusing on this issue is important because counterproductive behaviour can potentially have a negative impact which is greater than that of the positive sustainability management activities implemented (Francoeur et al. 2021, 17).

It also needs to be taken into account that individual behaviour differs depending on the context in which it is carried out. For example, employees may engage in sustainable behaviour in their private lives, but not in the workplace. Institutional obstacles, constraints and barriers often reduce the likelihood of employees engaging in sustainable behaviour in the workplace. Typically, the barriers in the institutional situation include aspects of the organisation and its leadership as well as the psychological disposition of the individual (Paillé 2020, 91–92). This view of organisational obstacles is certainly relevant for the implementation of sustainability management. Museums that seek to promote sustainable practices within the institution can benefit from integrating into SMM the personal habits and skills of staff developed and applied outside the confines of the museum, i.e. in the private sphere (Paillé 2020, 77). The overlaps with the private activities of employees can be explored even further. In order to increase the impact of sustainability efforts, employees can act as multipliers. One mechanism for this is institutional volunteering, in which employees spend a day, for example, working for sustainability-related charitable projects and institutions. Secondment goes one step further. Here, employees are involved in charitable or community projects for longer periods of time, e.g. in mentoring programmes. Private involvement in voluntary work can also be supported by the museum through giving time off or matching donations (Taubken and Dietrich 2011, 430).

A simple and effective tool to inspire employees for the process and at the same time to develop sustainability management as a systematic improvement process is the establishment of a central suggestion scheme. A suggestion scheme provides a structure for collecting and following up on ideas from all employees. All ideas from employees that can contribute to improving the sustainability of the museum are collected. Such ideas can relate to all aspects of the work: the infrastructural framework, the internal processes or the working culture and collaboration. This central mechanism should be set up and managed by the sustainability team. It offers a very easy-to-use service that – especially in the complex field of sustainability, and in large museums where communication between all staff members is difficult – can have an enormous impact.

Toolbox

Method | Shared enjoyment of change

Team spirit can be promoted in larger groups within the museum, as well as with important stakeholders, through informal forms of participation, co-creation and communication. These include team-building measures, events and celebrations that are linked with the sustainability management process, as well as content-driven events such as film screenings, reading circles or fish-bowl discussions. Such activities can also be supported by internal communication measures with tools such as postcards or posters.

Note

1 Analogous to experiences of empowerment in the social sciences.

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12 Sustainability strategy, targets and indicators in museums

Emergent change in the museum is characterised by numerous ideas, diverse activities and practical measures. In order to connect the requirements of the guiding principle of sustainability and the general considerations on impact orientation with these small-scale measures, it will be explained here how strategic approaches, precise targets and verifiable indicators can be generated. These methods are then embedded in the participatory change process in the museum.

12.1 Mission statement and launch

The start of the participatory process can also be structured in advance in order to give all participants some orientation during the initial phase of the transformation. Here, tools that generate attention and have a motivating effect among the staff are important; these include a story of change, a mission statement and the possibility of participation.

Telling the sustainable change story

A Sustainable Change Story recounts the technical justification for the introduction of sustainability management. It outlines in a comprehensible and appealing way why this procedure makes sense. The Sustainable Change Story creates a motivational vision for the future of a museum and outlines how the institution needs to change in order to achieve this vision. As a participatory story, it places the role of staff at the centre and encourages reflection and discussion on how this goal, this vision of the future, can be achieved. The story derives its strength from the links to everyday aspects of the museum's work and takes them as its starting point: In doing so, it explores the changes needed in the culture of work and the changes to be expected in everyday working life.

A Sustainable Change Story is often composed of the following building blocks:

- descriptions of the status quo, the problems and the reasons for change,
- the identification of the desired goal of the changes within the framework of sustainability management,

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- motivation through negative vision: raising awareness of the consequences if no change takes place,
- an introduction to sustainability management in museums and a demonstration of its benefits,
- critical reflection on what should remain as it was in the museum and what will change,
- proposals as to the next steps, in particular in the participation process, and the initial milestones,
- where possible, specific information on how the changes will affect everyday working life. Here it is also possible to make a first presentation on the detailed impacts broken down by department.

The Sustainable Change Story is supported by the senior management level and endorsed and ideally even developed by the board. The story outlines a coherent picture of the task ahead and thus provides a starting point for staff to reflect on and discuss the reasons and goals for the change. The Sustainable Change Story is specifically tailored to each museum and avoids general statements and vague goals, otherwise it will have little credibility or persuasive power.

Initiating the process

The Sustainable Change Story is first presented and communicated by the senior management. This is the foundation for its acceptance and binding character. However, it represents only the very first step and the framework for the broad participation process by means of which SMM is developed and implemented. The aim of this first step is to evoke an initial internal picture of the change process. This is because the first impression is often decisive for employees' commitment to sustainability management. In order for staff to engage, the familiar value-based frame of reference for work in the museum should be cited and further developed. Visualisations such as visual protocols, sketchnoting or a change map can also help. Such a first step naturally includes participatory elements and methods that can be used in groups as well as in plenary meetings.

In large institutions, if it is not possible for all employees and relevant stakeholders to participate in a launch event, the sustainability change story should be presented to at least two other hierarchical levels of the museum. The change story can then be presented again to two lower levels in each department. This overlapping roll-out has the advantage for large museums and museum networks that the change story does not alter. Basically, this cross-hierarchical narrative provides an opportunity to exchange ideas about the vision, its requirements and impacts in different constellations of actors.

Outlining a vision

A short mission statement can be drawn up to complement and deepen the sustainable change story. A mission statement is less tailored to the process of

change and sustainability management, but focuses rather on a vision and on strategic goals in the field of sustainability. A sustainability mission statement represents the museum's self-image with regard to sustainability and provides orientation for all participants in the ongoing process. Such a short mission statement also has the advantage that it has a motivating effect due to its focus on goals. With a mission statement, the management commits to running the museum according to the principles of sustainability. This commitment should be written and binding, possibly even referring to existing initiatives or codes of conduct. The importance of this formal commitment for a successful start should not be underestimated.

In addition to a mission statement, a pledge can also be drawn up to make the start of the process even more binding. This can focus primarily on input factors, such as the provision of resources for the process. Ideally, such a pledge should refer to existing standards or certifications.

The presentation of the mission statement can take place within the framework of a formal evening event to which various stakeholders and possibly the press are also invited. In contrast to a sustainable change story, a mission statement can also be used for external communication. Due to its short form, it can also be posted up in prominent places in the institution and thereby find entry into the collective consciousness of the organisation.

12.2 Fields of action and goals

Sustainability is a comprehensive concept that, depending on its understanding and application, can contain a great deal, and often too much, when applied in museums. In order to make sustainability applicable in museums, a narrowing, a focusing on specific areas is essential.

The fields of action that are material to sustainability in any given museum depend very much on the specific framework conditions, e.g. the building or the size and history of the collection. The perspectives and expectations of the relevant stakeholders also define which areas are considered essential and which are not.

Defining the material fields of action

This principle of materiality is a central aspect of sustainability management and the associated reporting. It comes from the field of financial auditing and means that measurement and reporting should focus on significant and relevant information and, conversely, that insignificant information should be omitted. A focus on what is material when introducing sustainability management prevents the arbitrary selection of areas, topics and measures. However, this focus presupposes that a broad perspective on sustainability in the museum is adopted and discussed to begin with, i.e. in the launch phase and in the first stages of the participation process. Only against this background is a subsequent and meaningful narrowing of focus possible.

In the business world, materiality is also used to limit the very broad concept of sustainability to the issues and data that are truly relevant to the business in question and the added value produced (Bini and Bellucci 2020, 31). The principle of materiality used in this way can be applied to the sustainable museum. It then means that a field of action, an item of information or an indicator is material if the museum's sustainability performance is significantly influenced by it.

It follows that sustainability management should be applied where the potential for change and the contribution to a sustainable transformation are greatest. This usually requires an initial quantitative assessment of the sustainability-relevant impacts of museum operations. For the introduction of sustainability management, the assessment of materiality can therefore not be made on the basis of quantitative data, e.g. consumption data, as the status quo analysis has not yet been carried out and this data is not even available in most museums. In addition to this data-driven materiality analysis, another understanding of the materiality principle has emerged through the practice of sustainability reporting. Under a stakeholder focus, what is deemed material is what significantly influences the decisions of relevant stakeholders (Gietl et al. 2014, 67). This means that the materiality of the issues and indicators to be measured is also defined by the stakeholders.

The assessment of material fields of action and indicators should therefore be made in a participatory process. For this purpose, all stakeholders in the museum are identified and analysed with regard to their influence on the museum. The stakeholders with the greatest influence on the museum's activities and sustainability are defined as key stakeholders. A communication and participation process, a dialogue that includes these key stakeholders as a minimum, is then planned and implemented. The appropriate type of participation is also defined for each key stakeholder.

An initial analysis is carried out in a qualitative assessment together with key stakeholders as part of a stakeholder dialogue. This is reviewed and refined internally, drawing on the experience of long-serving employees, senior management and members of the advisory board, for example. An internal assessment of material aspects and the external perspective of stakeholders can be combined in a materiality matrix. In this matrix, all aspects are entered into a system of coordinates showing internal importance on one axis and external importance on the other.

In the first few years following the introduction of sustainability management, there will not necessarily be a database available that is sufficiently robust to allow materiality to be determined solely on a quantitative basis. In this initial stage, materiality can be determined through an iterative process in which the fields of action and indicators are repeatedly checked for materiality and readjusted. A materiality analysis is thus dynamic and must be updated regularly. The monitoring for SMM can be used for this purpose. This not only means that the measurement tools can be adjusted, but also

ensures that the topics and indicators of sustainability management identified will continue to be material for the museum in the future (siehe Taylor 2021, 156).[1]

Formulating sustainability strategy and goals

Between the mission statement and the specific, verifiable indicators and goals of SMM come the strategic goals of the museum. These sustainability goals for the museum are based on and derived from the mission statement. Strategic goals define the guidelines for evaluating the museum's performance. They thus form the basis for strategic decisions and serve as a benchmark for the activities of the management. In this way, the sustainability strategy gives practical form to the vision of the mission statement.

Strategic goals require elaboration. Accordingly, they cannot be described succinctly or in one word, as indicators can. Rather, strategic objectives describe in more detail how the overarching mission statement is to be addressed within the museum. The development of two to three goal hierarchies can also be helpful here. Each of the defined main goals is assigned several sub-goals. This way of proceeding corresponds to a step-by-step fleshing out of the mission statement into indicators and can therefore also be used as a preparation for the identification or elaboration of relevant indicators. In addition, the various goals and sub-goals can be prioritised. This prioritisation can be based not only on the materiality of the sustainability contribution but also on internal conditions – which can also change – such as content-related emphases or available resources. Ideally, such a system of target priorities is flexible and easily adaptable, so that it is possible to react quickly to changes in operations. Furthermore, strategic goals can also be staggered over time. This allows a distinction to be made between medium- and long-term goals and the identification of measures to be adjusted accordingly. Although strategic goals should also be formulated to be measurable, it is often not possible to use absolute values for them. If quantitative targets seem appropriate, then targets that are relative, such as a ten per cent reduction, may be comparatively easy to apply. Often, qualitative target descriptions are also sufficient to define this target level between the mission statement and the indicators.

The conceptualisation of strategic goals is probably the most important goal formulation of all – this is true for both internal and external communication as well as for identification with and motivation for the overall process. Strategic goals are more specific and tangible than the short, overarching and also outward-looking mission statement. At the same time, they are not as specific and technical as indicators, which can be boring and off-putting, or only comprehensible and relevant to staff with specialist expertise. The formulation of strategic goals can thus motivate behaviour across departments and decisively shape the narrative.

Good practice

Sustainability action planning

Auckland Museum, New Zealand

As a leading encyclopaedic collecting institution with responsibility for natural and cultural heritage, Tāmaki Paenga Hira Auckland War Memorial Museum has a unique role to play its part in Aotearoa New Zealand's environmental, social and economic sustainability.

The decade 2020–2030 has been set out as a decade of action: global action, local action and people's action. As a civic anchor institution highly trusted by the community in Aotearoa's largest centre of population, Auckland Museum is well placed to support all three of these goals.

Globally, the Museum's Sustainability Action Plan (2021–2024) is aligned with the United Nations Sustainable Development Goals (SDGs), specifically focusing on seven SDG goals, where the Museum can readily have the most positive impact. The Action Plan also illustrates the contribution of the Museum as part of a global community of museums.

Locally, the city of Auckland has declared a climate emergency. Tāmaki Paenga Hira is in a unique position to support the sustainability ambitions of the city, both in how it operates as a public museum and destination attraction and notably in its role educating those who live here and visitors to the city. The Museum's goal is to contribute to the city's sustainability and to build cohesive and sustainable communities.

Guided by Aotearoa's indigenous peoples' principle of kaitiakitanga (guardianship), the responsibilities for care and protection go beyond the collections the Museum is entrusted with and include the future of the environments from which these collections originated. Aligned with the principle of manaakitanga (nurturing relationships), the Museum will deploy its collections, public programming and research capability to better understand the impacts of climate change on biodiversity and the daily lives of citizens. Through the visitor experience and public programming, the Museum aims to inspire and enable people to take action that sustains and enhances both the environment and community well-being. This Action Plan bridges the gap between public policy and the tools that empower individuals and communities to work towards a positive climate future.

The Museum's Sustainability Action Plan will deliver on key outcomes, enveloped by its guiding principles of Kaitiakitanga and Manaakitanga, and grounded by four pou (pillars) of action: Our People, Our Communities, Our Place and Our Mahi (Our Work).

Contributed by
David Gaimster

12.3 Modular indicator system for sustainable museums

Indicators give substance to the strategic goals of sustainability management and are indispensable for mapping the state of sustainability in museums in a comparable and objective way. The use of measurable indicators is therefore central to recording, verifying and communicating how sustainably a museum is operating.

Defining indicators

Indicators are developed based on the fields of action and the strategic goals. For this process, the principle of the logic model (vgl. Kap.5.1) is used. Ideally, a key indicator is defined for each field of action so that the sustainability performance in the different areas can be easily presented and communicated. For the sake of simplicity, data that have already been collected can also be mapped onto the key indicators at the beginning.

Indicators are qualitative or quantitative variables used to measure change. In contrast to accounting figures, indicators in sustainability management illustrate the museum's performance on different dimensions. Since indicators are gathered repeatedly in a recurrent monitoring process, the museum's progress over time and towards specific goals can be tracked. Indicators can help document the progress of the institution and facilitate the management of sustainability performance. Working with quantitative indicators very quickly reveals deficits and areas for improvement that could otherwise be glossed over in a qualitative survey. This opens up the possibility of precisely identifying areas where there is potential for optimisation. This approach is comparable to that of controlling, but for sustainability management more stakeholders need to be involved in the process and more uncertainties need to be mapped. The introduction of indicators often leads to specific outputs or data being collected for the first time and thus contributing to a more comprehensive picture of the museum. A number-driven approach is particularly necessary when it comes to sustainability, because otherwise such a broad concept cannot be translated into detailed and practical museum work, and there is then a risk that different interpretations of the concept will dilute the approach to sustainability management and jeopardise the whole process. Indicators serve both an internal and an external function. Within the institution, they aim to make the effects of the sustainability programme measurable. Externally, they serve in communication activities to demonstrate the institution's sustainability performance and the changes it has undergone.

Good sustainability management indicators should:

- be appropriate, i.e. the indicator measures what it is supposed to measure;
- be very clearly related to goals, i.e. the indicator shows whether a goal is being achieved or not;
- take into account the available data and the feasibility of collecting it;

- ideally be developed in a participatory way, and in any event be accepted by the stakeholders; and
- ideally be suitable for external communication, i.e. should also be comprehensible to outsiders.

When selecting indicators, one difficulty is the influence of individual values and attitudes. This plays a particularly important role in the case of sustainability performance indicators – compared to purely financial indicators, for example – because sustainability is a normative concept. In such cases, those in charge often tend to select the indicators that confirm their own views and that depict what supports the beliefs of other stakeholders – often regardless of whether the indicators are suitable for measuring what is material. In the process of developing indicators, these different perspectives and values should therefore be disclosed, and care should be taken to exclude the normative elements and to separate them from the factual elements (Dahl 2007, 171).

If the aspect to be measured is one-dimensional, clearly defined and easily measurable, a good indicator can usually be developed or defined without difficulty (e.g. paper consumption, use of renewable energies, number of visitors). Against the background of a logic model, impacts at the level of the audience or of society as a whole should also be measured as a rule. This is often not possible with the available means and methods at all, or it is only possible to measure specific partial aspects of the impact. In such cases, it is important to specify the limits to measurement or the limits to the methodology used to collect the data. If aspects or impacts are not directly measurable, the term "latent constructs" is used. Latent constructs are measured by means of aggregated indicators representing partial aspects, or by means of so-called proxy indicators.

As a rule, one indicator should be defined for each target. In certain cases, it makes sense to combine several indicators. Such a composite or aggregated set of indicators is also called an index. Thus an index can be a collection of different indicators. The advantage of indexes is that they can be used to map the essentials of a multidimensional area in a concise and comprehensible way. This makes them particularly suitable for the exchange of information with other stakeholders and the public, which contributes to decision-making support. The formation of aggregated indicators (indexes) involves as a minimum the normalisation, i.e. harmonisation of the units of the various indicators, the weighting of the indicators, and the actual aggregation. Since the creation of indexes must remain manageable for museum staff, equal weighting is recommended, possibly supplemented by a survey of staff or relevant stakeholders. A weighted arithmetic mean can be used as an aggregation method. If the index is to reflect a strong sustainability perspective, wherein deficits in sub-indicators cannot be compensated for elsewhere, additional methods must be used (siehe Gan et al. 2017, 499).[2] A correct, systematic and transparent way of working is particularly important at this point, as otherwise the information value of the indexes is compromised and the entire measurement of sustainability performance can be

called into question (Böhringer and Jochem 2007, 7). This can be especially problematic in external communication as well as in sustainability reporting if, due to arbitrary methodology, the reported sustainability performance can be called into question and criticised.

Adapting sustainability indicators

Due to the multidimensionality of the concept of sustainability and the different framework conditions under which museums operate, it does not make sense to try to develop a universally valid and transferable measure of sustainability based on a single indicator or a fixed collection of indicators (an indicator set).

Rather, a review of the numerous indicator sets from different fields of application can inform the selection of sustainability indicators for the museum sector. Indicator sets for measuring sustainability range from more scientific approaches to simplified approaches aimed at ease of use. An overview of numerous indicator sets is given by Singh et al. (2009) and Böhringer and Jochem (2007), among others. A large number of illustrative indicators can also be found in Epstein and Rejc (2014, 169–176). There is also an indicator set for measuring the SDGs (United Nations 2020). Because of its very comprehensive and global focus, it contains many perspectives that are less relevant to museum work; however, it can serve as an orientation framework, and can also stimulate the development of indicators for individual museums.

In addition to generic approaches to measuring sustainability, there are numerous tools and indicator sets for assessing the sustainability performance of companies. These offer useful orientation for the development of an indicator set for an individual museum. A distinction can be made here between models (frameworks) and norms (standards). Such models include principles and guidelines that support companies in measuring and reporting their sustainability performance. Models include the Global Compact, Global Reporting Initiative (GRI), Social Reporting Standard (SRS), Carbon Disclosure Project, Eco Management and Audit Scheme (EMAS) and the Greenhouse Gas Protocol. In essence, they are collections of indicators that vary according to the interests and perspectives of those developing them. They focus on certain key aspects of sustainability, sometimes omitting other aspects entirely. Norms, or standards, have a similar function, but usually contain detailed requirements and specifications and are systematically and formally documented. These standards include ISO 26000, ISO 14001, ISO 9001, EMAS, AA1000, SA8000 and OHSAS 18001. While these standards allow less scope for creativity, they contribute to comparability and can be helpful in implementing sustainability management consistently (Siew 2015, 182). In most of these models and standards, external impacts with regard to the development of local social capital are often neglected, not least because such qualitative impacts are difficult to capture and measure.

The introduction of a model or the implementation of a standard at a museum involves considerable time and effort, which usually only larger institutions can afford. In order for the museum sector's contribution to a sustainable future to be visible, it is important that institutions of international and national standing set out to implement one or other of these approaches. Which approach is the most appropriate depends, among other things, on the orientation of the museum, the skills of the staff and the existing usage in the local region.

Indicators specific to museums

The development of indicators can also start from the specific perspective of museums. The evaluation of museums has led to extensive discussions on performance or quality indicators for museums (vgl. Jacobsen 2016). Another approach is to derive museum-specific indicators from business performance indicators for cultural organisations (siehe Gilhespy 1999). In addition, museum-specific guidelines and standards can be helpful as starting points for defining indicators, e.g. collection standards, human rights or financial aspects. These documents, which often vary from country to country, usually contain key data that can be modified to provide indicators for measuring sustainability, or on the basis of which similarly aggregated indicators for measuring sustainability can be developed. An analysis of locally applicable guidelines and standards can also be helpful in identifying potential fields of action for sustainability management (Adams 2009, 25). In fact, there are approaches to measuring the performance of museums that overlap with sustainability measurement and can serve as a starting point for sustainability indicators (z.B. Poll 2018, 98–100; Anderson 2004). The Balanced Scorecard analysis tool has also been adapted for museums. Indicators have been developed for such subsidiary success factors as conservation, research activity, knowledge dissemination, networking and collaboration, organisational development, human resource development, market analysis, governance and financial support (Zorloni 2012, 39–43). For art museums, indicators such as visitor numbers, exhibition and public programme development, development of new knowledge, publications, collection management and efficiency of resource use have been developed for the Balanced Scorecard (Fox 2006, 29).

One conclusion from the analysis of indicator systems is that they should be developed in each case by those who apply them and by the relevant stakeholders (Singh et al. 2009, 210).[3] The development of indicators for the SDGs has also shown that it is important to conceptualise a suitable set of indicators and to adapt the methodology of applying them to the situation, rather than evaluating data that is collected anyway (Hák et al. 2016, 572). In this respect, a central task of sustainability management is to develop the appropriate indicators for each museum individually. The following toolbox can help with this and can serve to stimulate ideas.

Modular indicator system

When selecting indicators for an individual indicator set, it is important to map the logic model. This means that indicators must take into account the level at which impact is measured. As a starting point for developing individual indicators, it can be helpful to list possible indicators for input, output, outcome and impact for each department.

However, depending on the size and focus of the museum as well as its status in the local community, different indicators may be appropriate. Furthermore, the formulation of practicable indicators also depends on the available resources and the methods used. It therefore does not seem sensible to recommend a generic set of indicators for museums. Rather, the following non-exhaustive list serves as a collection of ideas for selecting possible indicators. This collection of ideas can be adapted for the individual museum in a two-step process. First, a materiality analysis, based in part on experience, can be helpful in selecting indicators from the collection. In a second step, the indicators are specified in terms of dimensions or units. A qualitative as well as a quantitative measurement is possible for the indicators. A quantitative measurement can be represented by a number, but also by a sustainability quota. A sustainability quota can express, for example, the share of exhibition, research or education projects with a sustainability focus in the total number of such projects.

The indicators in the collection of ideas largely refer to the output level, as indicators at the outcome and impact levels are also dependent on survey methods. As a low-threshold entry point, a focus on the impact level of the input can also be helpful. In this way, it is possible to assess whether there is a comprehensible and detailed statement of intent for the indicators or whether resources have been made available to achieve them.

Management and governance
Stakeholders included and frequency of dialogue events
Levels of impact measurement for specific activities
Structure of staff and management, broken down by different diversity indicators
Job satisfaction of employees
Meetings of the top management level on sustainability issues
Further training on sustainability, broken down by hierarchy level and diversity indicators
Contacts and meetings with political decision-makers
Joint campaigns and events with activists
Administration and operations
Tenders incorporating sustainability requirements
Commissioned service providers who have to meet sustainability criteria

(*Continued*)

Extent of internalised costs
CO_2 emissions
Total energy consumption, broken down into renewable and non-renewable energy sources
Total water consumption
Total volume of waste, and proportion recycled
Sustainably produced and fair trade goods (shop)
Locally sourced and organically produced products (catering)

Collection and conservation

Formal agreements and events with communities of origin
Rate of accession or deaccession
Widening the climate corridors
Use of environment-friendly materials in conservation and restoration work

Research and science

Transdisciplinary research projects
Information and data in the public domain
Research projects and publications related to sustainability
Citizen Science projects

Exhibition and curation

Exhibitions in cooperation with communities of origin
Exhibitions aimed at promoting sustainable behaviour
Exhibition items that are borrowed or reused
Exhibition stands built with pollutant-free and easily recyclable materials
Objects loaned and borrowed
Choice of transport means for loans

Education and participation

Programmes geared towards sub-competencies
Museum departments with participatory programmes
Extent of participation in projects
Applied projects to promote sustainability at the local level outside the museum

Sustainability as a change process

Resources available to the head of sustainability and the sustainability team
Staff members whose job description includes a reference to sustainability
Indicators employed
Staff members involved in monitoring
Scope and standard of reporting

12.4 Analysis of the status quo and monitoring

After the indicators have been determined, the first data collection, the analysis of the status quo, can start. In a status quo analysis the baseline situation for all indicators is collected. These baseline values represent the situation before the start of measures to improve sustainability. The collection of this data is important because otherwise there are no comparative values and it is not possible to assess what impact sustainability management has had. The preceding materiality analysis serves to reduce the scope of the status quo analysis and to focus the data collection activities on the essential areas right from the start. This minimises the risk of the process getting bogged down already in the initial data collection phase and not developing the necessary momentum.

The very first collection of indicators constitutes a comprehensive review of how the museum is performing in its current operations. The process of the first data collection also serves as a vehicle and platform for participation and engagement. Data collection is fundamentally suited to gathering and systematising decentralised knowledge. What is important for long-term data collection is that it is carried out in a decentralised manner and integrated into existing processes. If the measurement procedures are not integrated into the work processes, this can certainly lead to discomfort and resistance among employees and overall conflicts within the museum (siehe Arvidson and Lyon 2014, 879).[4] Overall, the support of internal structures, e.g. the administrative department, is essential.

Measuring indicators: methods of data collection

First of all, the assessment boundaries for the individual indicators must be defined. The boundaries of the assessment can also lie outside the museum or the museum's direct sphere of influence. However, in such cases the additional effort required for data collection will need to be weighed up.

The selection of a suitable toolkit for data collection is largely based on the previously determined indicators and the assessment boundaries. The scope and level of detail of the data to be collected also play a role. Possible data collection methods differ in terms of the time and cost involved and the expertise they require. In addition to the actual measuring or the collection of data, social science methods are also used, especially for the outcome and impact levels. Extensive methods that are more closely based on scientific monitoring approaches include social science studies involving control groups, participant observation or standardised test procedures. Methods that require less effort to implement and are recommended for work in museums include surveys, e.g. using questionnaires, focus groups, guided interviews and the collection of data, e.g. participants, consumption. Case studies, anecdotal narratives and documentation using photos and video material are more journalistic in character and can be used as supplementary methods in museums. In general, the more complex the methods, the more reliable the

results. There may be a trade-off here between the resources available and the robustness of the data collection. Often the choice of method will also depend on the methodological expertise of the employees responsible for the survey. If no resources are available for a quantitative measurement process, qualitative surveys can completely replace quantitative methods. For external communication in particular, the collection of case studies or narrative elements is an important basis for conveying the sustainability process authentically and personally in reporting.

The collection and compilation of quantitative results is usually done using spreadsheet programmes. This procedure makes sense for small museums and is expedient, at least in an early phase, e.g. in the first years of sustainability management. The characteristics of a good system for storing data are comparable with those for financial controlling. However, for large institutions, e.g. national museums or museum associations, such an approach quickly reaches its limits when computing operations and data aggregation become more difficult. In addition, the transfer of data to other areas or for external communication often leads to time-consuming work steps and can be faulty. So when sustainability management is introduced in large institutions, consideration should be given to whether it would make more sense to use a data-based collection system.

The reporting and monitoring of the indicators depend significantly on the availability and quality of the data collected. As a rule, the introduction of sustainability management is associated with an increase in the quality of the data that was already being collected and a professionalisation of data processing. This applies both to the sources of the data and to its compilation. It is important to ensure data quality through a uniform system across all levels by defining the time intervals for data collection, the data format, the boundaries for data collection and the type of data transmission and storage (Braun et al. 2010, 26).

One challenge for museum staff is to ensure that these data requirements are met in their routine work and thus to guarantee data quality on an ongoing basis. For example, data may have errors due to insufficient methodological expertise, or it may be incomplete or only estimated. The nature of such discrepancies must be documented and taken into account in data aggregation to avoid erroneous indicator values. In large institutions or in the case of comprehensive sustainability management with numerous indicators, it can be useful to document the specifications and the systems for data collection in a manual (Braun et al. 2010, 26).

For each indicator, a target value in relation to the baseline value is defined, which is to be achieved by means of the sustainability management measures. This target value is the quantitative representation of a soft or qualitative target. One problematic challenge is how realistically the target values are defined. Basically, the target value is set with reference to the baseline data as well as the resources that can be used in this area to improve sustainability performance. In addition, comparative or empirical values from other museums or related sectors can also be used as a point of reference. In any event, a quantitative specification should not be avoided, even if this procedure introduces a

controlling approach into a hitherto visionary and participatory process. A matrix for the development and documentation of target values for this process can be used, describing for each target the indicator, the baseline value, the target value and the rationale for this target value (Rickert 2016, 68).

Monitoring progress

Monitoring involves providing a uniform summary of the results of sustainability management and comparing these results with the strategic goals. Conclusions about the indicators and the achievement of target values are drawn on the basis of the data collected. In order to identify obstacles at an early stage, the progress made is also monitored and documented. The indicators should be collected at least once a year and ideally more often, for example on a quarterly basis.

Monitoring will only contribute to sustainability management if the results of the monitoring are directly incorporated into the revision of processes and measures, thus ensuring a continuous improvement process. Systematic monitoring also has a wide range of potential benefits for sustainability management. These include data-based support for decision-making and the reduction of uncertainties. Monitoring also serves to highlight effective and less effective measures. Through monitoring, deficits and undesirable developments can be identified and corrected at an early stage. It enables the identification and communication of successes and thus increases the credibility and transparency of sustainability management.

The mechanisms used for measuring and checking in monitoring often provoke resistance, and its implementation is hampered by numerous obstacles. A key prerequisite for monitoring is that the necessary data is collected and made available to the relevant actors on a regular basis. This requires additional time and expenditure. People also frequently question whether monitoring is necessary at all and argue that the implementation of a sustainability programme will lead to good results even without monitoring. And in fact, the risk that monitoring will reveal negative results often undermines efforts to implement monitoring. In particular, the interpretation of the data, especially in the case of qualitative indicators, can give rise to differences of opinion. Due to the usually non-scientific character of this approach and a lack of transparency for all stakeholders, the results of monitoring are actually often called into question. The core of the criticism usually relates to the accuracy and meaningfulness of the results. Even if some of the criticism seems justified, it is essentially aimed at typical framework conditions for the museum sector, such as budget shortages. These points of criticism should therefore not in themselves be allowed to prevent the implementation of sustainability management in museums.

The progress of the organisational transformation process can also be examined. For example, changes in the work culture and in employees' values can be analysed. This could be done, for example, by surveying the level of acceptance for sustainability management and asking how employees

evaluate the changes brought about by sustainability management. A survey of this kind should be carried out using participatory methods, just as the measurement and interpretation of the data is carried out in a participatory and transparent manner. Eminently suitable for this purpose are qualitative methods such as sounding boards, a moderation method that enables feedback to be collected in a non-hierarchical way and fed into the process.

12.5 Resources and timeframes

Improving sustainability performance usually also entails costs – a sustainable future and a better life for all comes at a price. However, the familiar objection that sustainability is expensive comes from a short-term perspective, which is precisely not the intergenerational way of looking at sustainability and how it works. While the need for investments can be seen as an obstacle in the short term, these investments bring with them a wide range of opportunities. These opportunities often include savings through increased resource efficiency, so that investments pay for themselves in the long term through lower operating costs. In addition, these investments pay off in the longer term through enhancing the museum's reputation. These long-term economic benefits should not obscure the need for public funding programmes for museums in order to cover the necessary investments.

Janes and Sandell (2019) also emphasise that pointing to the costs of sustainability efforts can be seen as a fundamentally deficit-oriented perspective that stems from the growth paradigm of the current economic system. The scarcity of resources is often used in this way as an excuse or apology for a failure to change. In contrast, museums and their staff can be seen as organisations with a wealth of skills, knowledge and resources that can advance sustainability – even without additional funding (Janes and Sandell 2019, 2).

The time required to implement SMM depends mainly on the size of the institution and the actors and roles involved. Here, a distinction must be made between the initial investment of time (mainly to carry out the status quo analysis and the participation process) and the continuous time input. In a status quo analysis, time is mainly needed for data collection. Depending on the indicator and measurement method chosen, the analysis can become infinitely complex. A definitive estimate of the time required is therefore not possible. What is needed is something that is practicable for the institution in question. Providing support through research projects, academic dissertations or student theses can also be a clever way to get the process started. By the time of the implementation phase at the latest, a head of sustainability is needed who has the necessary time resources to implement the activities of the sustainability programme or to drive their implementation forward. Once sustainability management has been established, the ongoing time commitment can be defined, in cooperation with the stakeholders, on the basis of the experience gained during the establishment phase. In this process, the

different staff positions and roles and their respective time budgets must be taken into account.

Setting a realistic timeframe

Although sustainability management is a long-term, iterative process, it is important that an initial cycle through to reporting is completed and implemented within a reasonable period of time, otherwise employee engagement may suffer.

Depending on the complexity and depth of the participation process, initiating and planning the process can take several months, mainly because strategic decisions also need to be taken and resources made available during this phase. The status quo analysis is a key building block for the start of sustainability management, one that can become almost infinitely long depending on the indicators and methods of data collection chosen. The creation of a sustainability programme can be accelerated considerably by means of a continuous participatory process initiated at the very beginning, as well as a suggestion scheme. This is followed by the implementation of measures to improve sustainability performance and the preparation of a sustainability report. As a rough guide, it should be possible to publish a first sustainability report within one year.

However, the timeframe for the entire change process usually goes far beyond the time needed to reach this first concrete goal, and often stretches over many years (Kotter 1996, 3–16).

Notes

1 With reference to strategy development in CSR management.
2 Derived from recommendations on aggregated sustainability indexes.
3 Drawing on general sustainability evaluation systems.
4 Taken from impact research in the non-profit sector.

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13 Implementation and sustainability reporting in museums

The actual implementation of SMM begins with the development of measures and the formulation of the sustainability programme. This involves developing a creative way of dealing with any resistance and conflicting goals that may arise. The first cycle of SMM is completed with the internal and external reporting on the process and its results.

13.1 The sustainability programme: measures and conflicting goals

The sustainability programme is at the heart of sustainability management, because it describes in detail the measures to be taken to achieve sustainability in practice and the ways in which processes and behaviours need to be changed. Based on the goals and the indicators, measures are developed that lead to the achievement of the goals and the improvement of sustainability performance. One or more measures are assigned to each goal and each indicator. The multifaceted nature of the museum sector and the complexity of a transformation towards sustainability mean that it would not make sense to list exemplary measures here, firstly because they would exceed the scope of this book and secondly because they would never be tailored precisely to the specific situation on the ground. Ideally, the measures will be defined within the respective departments, because this is where the greatest process knowledge is available on how the goals can be achieved. The measures proposed in Part II of this book may serve as a stimulus. The sustainability team then has the task of harmonising and, where appropriate, selecting the measures. This bundle of measures is brought together in the sustainability programme. It provides an overview of the activities the museum is undertaking to improve its sustainability performance.

A sustainability programme also includes the designated resources, the person responsible for implementation and a deadline for each measure. During the implementation phase, these measures are carried out and applied in the daily operation of the museum.

To support the systematic implementation of measures, incentive systems for the employees can be established. Examples include symbolic incentives such as Olympiads of ideas or awards for optimising processes with regard to sustainability performance. The technique of prototyping, as applied in

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Theory U, can also be used for the implementation of the sustainability programme. This involves developing a prototypical microcosm that represents a small version of the future. Ideally, this microcosm or subsystem is of strategic importance within the museum and contains all the main elements of the vision. This approach requires familiarisation, as activities are already started before the entire sustainability programme with all its objectives and measures has been elaborated (Scharmer 2009, 417).

Anticipating conflicts

A broad understanding of sustainability involves a potential multitude of goals that may conflict with each other. In a narrower sense, different goals can contradict each other or the achievement of one goal can adversely affect another goal. This also applies to the interests of different stakeholders, who may have conflicting expectations of museums. In particular, different goals are likely to be in competition for the resources at the disposal of museums, such as time and money. With the scarce resources available, it is often not possible to achieve all the goals at the same time. Conflicts are therefore likely to arise within the SMM between objectives and between the stakeholders supporting them, both inside and outside the museum, and these need to be managed (siehe Wedl and Reimoser 2016, 22).

One example is the long-standing scientifically grounded discussion about the trade-off between energy saving and conservation requirements. But in the exhibition sector, too, an attractive, media-intensive exhibition can conflict with the goal of low energy consumption. At the same time, such an exhibition may also generate higher visitor numbers and have a greater social impact through the multiplier effect of the audience it attracts.

In the context of SMM, it therefore always makes sense to try to anticipate potential conflicts between different goals. For this purpose, interactions between the individual goals need to be analysed. Management tools such as the Sustainability Balanced Scorecard can be used to easily identify conflicting goal dimensions (siehe Chai 2009). It is then important to take these conflicts into account and to discuss them with the actors involved. Such open discussion about conflicting goals is a prerequisite for dealing with them constructively.

Weighing up conflicting goals

In order to resolve such conflicts between goals or to make decisions within the framework of sustainability management, the anticipated effects of the different options for action must first be assessed and evaluated. In this way, the advantages and disadvantages of different goals can be identified. Utility or risk analyses are among the methods suitable for this purpose. However, such assessment methods require comprehensive information on the individual alternatives, which is usually not available. Because the information needed is often lacking, a verbal-argumentative approach may also be appropriate.

This approach is also suitable because it is easily manageable with little time and at low cost. In contrast to purely intuitive approaches, verbal-argumentative assessments represent a methodically structured assessment process that is also easy for stakeholders to follow and therefore creates transparency. As part of the weighing-up process, objectives can be prioritised and weighted at the strategic level. If there are numerous goals to be considered, a matrix can be used for a twofold evaluation using both relative and absolute weighting. In this way, the priority or core goals can be identified. This can also be implemented as an element of participatory processes involving the relevant stakeholders. Such a transparent approach is particularly useful when the conflicting interests of different stakeholders are at issue. Ultimately, the weighing-up of the options is based on a detailed presentation of the benefits and disbenefits of the different goals.

In addition to an assessment of the anticipated impacts, the following approaches can also help to address conflicts between different goals (Wedl and Reimoser 2016, 22):

- Different goals can sometimes be integrated into one overarching goal, which defuses the conflict.
- The achievement of the goals can be made more flexible by widening the corridors for the target values. In this way, target dimensions that are only slightly in conflict with each other can be defused in individual cases.
- In a situation where a choice is required, it may be possible to re-assess which aspects of the conflicting goals are actually relevant to the decision.

In difficult conflicts, if the approaches described above are not successful, the use of sustainability scenarios can be a way of reaching a decision with regard to conflicting goals. Such opposing scenarios are largely based on the impacts of the measures needed to achieve the respective goals.

Toolbox

Method | Resolving conflicts between goals

Implementing sustainability in museums involves conflicting goals and will inevitably lead to tensions and conflicts between staff members. In order to develop ways of resolving such conflicts, a technique called "Thriving for Awareness for Non-Conflicting Strategies", or Thancs for short, can be used. With the Thancs technique, tensions can be identified and shared reflection on values, needs and individual priorities enabled. It also creates a communication space where these tensions can be analysed and a creative process facilitated for the development of actions and behavioural change (Rauschmayer and Omann 2011, 151–158).

13.2 Overcoming resistance and taking the first small steps

In order for SMM to be introduced successfully, various challenges need to be anticipated and overcome. In doing so, it is possible to draw on many years of experience with regard to obstacles to the introduction of change processes as well as to the introduction of sustainability management in other sectors. General obstacles to change processes include the human impulse to stay put in what is familiar and to reject change, as well as the complexity and inertia of organisational structures (see Figure 13.1).

The introduction of sustainability management and the integration of sustainability as a core value of museum work can be seen as a revolutionary or transformative change. It represents a far-reaching change in the way the museum works. The change encompasses the entire institution with all its departments and functions. Many of the changes involved do not seem immediately comprehensible. Due to this break with the previous way of working, one which may be perceived as abrupt, the resistance to be expected can be considerable. Resistance should therefore always be expected when sustainability management is introduced.

Tackling resistance at the individual level

There are many different reasons why resistance may arise among staff. There may be doubts about the programme content, for example, or perhaps personal fears and interests may lead people to reject it. The early and in-depth involvement of all relevant stakeholders and individual actors is the most effective strategy overall for overcoming obstacles. A promising approach is to involve those employees most closely who have doubts about the content. For this, a technically sophisticated, well-founded sustainability management programme and a detailed plan of action are necessary. If, in the course of a technical discussion, new objections are repeatedly raised, this may indicate that the resistance is not based on technical or factual arguments but on personal concerns or fears. If these personal reasons are not taken into account, it can lead to blocking behaviour. Employees' fears or concerns about change must be met primarily on an emotional level. What is needed, therefore, is not so much factual arguments as empathy for the concerns. The issue of self-interest and personal concerns should therefore also be addressed in participation processes. Sometimes it may also be necessary to talk to employees individually in order to address this resistance.

Overcoming organisational obstacles

In addition to changes in individual behaviour, a transformation towards sustainability also requires changes in the organisational structures of museums. Organisational obstacles include a lack of practical support and, above all, a lack of commitment from the management. Management support is essential

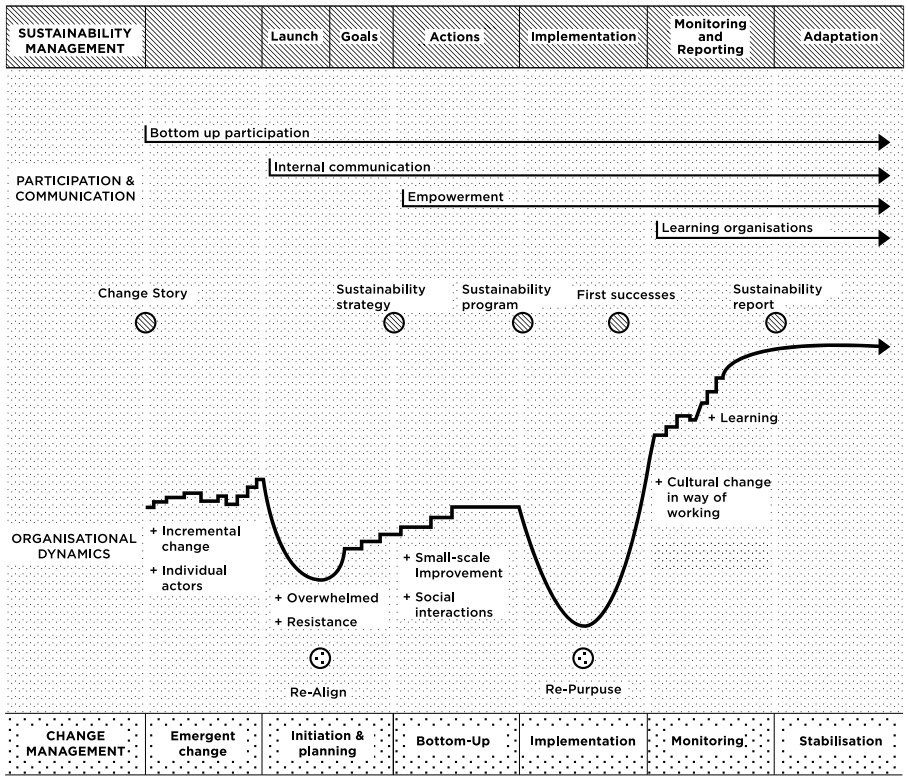

Figure 13.1 Sustainability management in the museum as a change process.

Source: Based on Kotter 1996; Kübler-Ross and Byock 2019; Scharmer 2009.

for the internal legitimacy of the process. The management has to balance this against other tasks and thus also to defend it against other internal resistance. In addition, a lack of operational support from the administrative department can be problematic, as this is vital for collating or gathering much of the necessary data. Insufficient resources for the head of sustainability also represent a risk. This is especially relevant if this post is held by a staff member who can only allocate a part of their time budget to it. Another common obstacle is overly ambitious targets, indicators or activities. It is usually not possible to work on all the task areas and indicators identified in the participation process. Wanting to do too much at the beginning can very quickly lead to demotivation and frustration. Here it is important to formulate realistically achievable goals. Later in the process, doubts often arise about the outcomes of sustainability management; for example, the fear that the results could be damaging to the museum's reputation. But in keeping with the aim the spirit of transparency, negative results can also be communicated in such a way that they constitute a starting point and a prerequisite for improving the status quo.

Adapting to the size of the institution

For medium-sized and small museums and so-called micro-museums, comprehensive sustainability management is often not feasible. The small size of the museum can make implementation difficult, and not only on account of the limited resources available. For example, formalised processes, measurement and monitoring are less common in smaller museums and often more difficult to implement due to a lack of organisational structures. In general, there is also the danger that individual fields of action or complex measures require so much effort that the overall goal can no longer be achieved with the limited resources available (see Ford 2009, 315).[1]

However, it can also be advantageous for the implementation of sustainability management if the institution is small. Less developed organisational structures also mean greater agility and less inertia. Small museums are often dynamic environments in which change processes are easier to implement on account of their size. More specifically, smaller museums can benefit from the fact that they often have flatter hierarchies and fewer strictly separated departments. Similarly, employees often take on several functions in different roles. This facilitates a holistic view of the organisation and the cross-functional cooperation that is needed (see Mazzarol and Reboud 2020, 20).[2] Thus, despite their fewer resources, the implementation of the transversal task of sustainability management can be easier and reliant on fewer preconditions in small institutions than in larger ones.

For museums with fewer resources, there are a number of very specific approaches that can be taken to promote sustainability. The four key starting points for implementing sustainability management in smaller institutions are (see Andreas 2011, 215–216):

- a shared vision,
- leadership style and changing values,
- changes in, and integration into, structures and processes,
- sustainability as an opportunity and an inspiration for others.

The main prerequisite for a long-term successful change process is therefore the joint work on the mission and vision of the museum. If the realignment at this strategic level succeeds on a participatory basis, then the first hurdle to implementation has already been cleared.

Since change in smaller museums is less likely to be implemented through formal guidelines and vertical structures, value change and empowerment are the key success factors for sustainability management. In smaller museums with flatter hierarchies and less regulated decision-making powers, leadership style and changes in working culture are especially important. Especially in small institutions, a sustainable leadership style (vgl. Kap.5.2) based on open cooperation is indispensable for a successful change process facilitated by team spirit and good internal communication (García-Muiña et al. 2019, 4372).

In order to streamline the process of sustainability management, the key thing for smaller institutions is to greatly simplify indicators and their measurement and the methods used for this. Similarly, reporting can be dispensed with, or the results can be prepared on a qualitative or anecdotal basis for external communication. The participatory process and internal communication are much less complex in smaller museums and fewer staff need to participate. Nevertheless, deep participation can be a very time-consuming process which may not be possible with a small number of staff. It is important therefore to find a pragmatic course with the help of participation methods that are easy to implement and that support decision-making. It must be possible to combine an adequate commitment to the process of change on the part of the staff with proper representation of all the interests of the staff and with the resources available.

Unlike in large institutions, sustainability will not work as a separately budgeted task in small museums. It must therefore be integrated into organisational structures and processes and become a normal aspect of everyday work. Implementation can start with small, low-cost activities. As soon as the first successes have been achieved and a motivating sense of community and a positive external perception have been created, the advantages that sustainability management brings will be recognised by the people involved. After that, bigger fields of action and bigger measures can be tackled (see Andreas 2011, 227).[3]

Particularly on a local or regional level, smaller museums have opportunities to cooperate with other actors in the field of sustainability from whom the museum can benefit. Strategic alliances for sustainability can promote changes in internal processes by integrating the know-how of other, external partners, and sometimes also open up new funding opportunities (García-Muiña et al. 2019, 4372).

The very personal interaction in micromuseums offers another opportunity through the multiplier function. In very small museums established and run exclusively by volunteers, there is often no clear distinction between subjective and objective information. The boundary between staff and visitors is blurred, just as subject-related, professional exchanges blend with private ones. This creates interactions and learning situations that are extraordinary and very personal (Candlin 2016, 182–183). This can be used to make sustainability a central topic and to communicate it. Due to the highly individual visitor experience, the impact on visitors can be assumed to be very strong and long-lasting.

Small steps, quick wins and low-hanging fruit

To prevent this broad topic from seeming overwhelming and to start implementing it quickly, it is helpful to identify so-called low-hanging fruit which enables quick wins to be made.

Toolbox

Sustainable practice | Micro steps

1 Addressing sustainability in professional and personal communication: talking to colleagues about sustainability.
2 Being curious and asking questions; challenging the status quo.
3 Consolidating the grassroots activities and the bottom-up process, e.g. holding a sustainability lunch once a month or setting up an informal working group on the topic of sustainability.
4 Action areas where a lot of preparatory work has already been done that can be built upon are particularly suitable for quick wins.
5 No-cost measures. How can a measure be modified in such a way that it retains its essential effectiveness but requires no (or hardly any) investment for implementation? Deferring measures that cost money for the time being.
6 Measures that can be implemented by individuals without the support of others. Implementation can be carried out by an individual person or a motivated group. The guiding question here is how can a measure be changed so that its implementation is not dependent on others, or the changes only need to be implemented in the immediate work environment or within a small team.
7 Measures that can be implemented by digital means only. These are often low-threshold, easy to implement and low-cost. For example, developing digital forms or "think before print" email signatures.
8 Enlisting professional support from outside the museum.

13.3 The sustainability report: design, production and publication

Regular communications about the progress of sustainability management are important for ensuring internal support for the change process and external visibility. Sustainability reporting is addressed to both internal and external readers and covers all relevant information on the progress of sustainability management in the museum as well as describing the goals, activities and achievements. For this purpose, the museum should use a self-selected, possibly standardised form of reporting. Internal communications serve in particular to guide improvement processes in the museum. The production of a sustainability report for external parties not only serves to inform stakeholders, but is also a public relations tool. Sustainability reporting can thus be understood as an official form of communication which focuses on information about sustainability and sustainability performance (Schaltegger 2014, 22).

The production of a sustainability report as an independent communications tool has many particular features. The suggestions in the following chapter are largely based on the general recommendations for the preparation of sustainability reports by Clausen (2001), which are embedded here in a new application context and supplemented with specific recommendations for the museum sector.

Principles and contents

According to Schaltegger (2014), sustainability reporting can take different approaches. Since museums generally enjoy a high level of trust, they can restrict their reporting to obvious aspects of sustainability. Such an approach is often driven by public relation considerations, and reporting then focuses on those aspects of sustainability that are currently en vogue or present in the media. This narrowing of the coverage is often chosen when the senior management level sees the museum's mission as being at odds with sustainability goals or when significant improvements in sustainability performance are deemed to be too costly or not practicable. This type of reporting usually serves to legitimise a "business as usual" approach (Schaltegger 2014, 24–25).[4]

A different approach is one that is driven by external standards and oriented towards reporting requirements. As a result of taking specifications and standards or norms into account, topics and indicators are integrated into museum operations and can thus lead to an improvement in sustainability performance. The entire process of sustainability management is thus thought through, conceived and initiated starting from the end result, i.e. reporting. In museums, reporting can then not infrequently be the trigger for the introduction of sustainability management. Such an approach, which is designed from the outside in, has the advantage of being able to tie in with known reporting standards (see Schaltegger 2014, 24–25). These standards include the Global Reporting Initiative, which issues guidelines for sustainability reporting that define reporting principles and standard information to be included. The Social Reporting

Standard, which is often used by non-profit organisations, is another possible source of guidance. Reporting in accordance with international standards is a worthwhile goal, but one that can probably only be achieved by the largest institutions and at considerable expense. Overall, it would seem that the GRI guidelines and other similarly comprehensive standards tie up too many resources and are therefore unlikely to be suitable for the museum sector (see Brandl 2011, 396).[5] Agenda 2030 and the U.N.'s SDGs also have an impact on reporting. However, an orientation towards the SDGs often leads to overly complex processes and standards. Because of their particular characteristics and processes, museums should not directly adopt reporting standards from other sectors, as this could lead to central aspects of sustainability in museum operations being overlooked (Wickham and Lehman 2014, 1024). Integrated reporting, in which ecological, economic and social aspects are interwoven, is most likely to meet the particular needs of museums and can also be seen as a logical development of traditional sustainability reporting (Busco and Sofra 2021, 203).

These well-known reporting standards or norms are mostly, though not exclusively, tailored to companies and therefore not appropriate to the specific challenges and potentials of museums. This is another reason why, in contrast to such approaches, an inside-out approach is recommended here. Reporting is the result of strategic sustainability management. Accordingly, sustainability reports document the results of a systematic improvement process in the museum with regard to its sustainability performance. Such a report communicates key figures and demonstrates an improvement in sustainability performance. As such, it is of particular interest to funders. The basic idea is to develop a unique selling proposition through demonstrable sustainability. Ideally, sustainability reporting goes another step further. Reporting can also be part of sustainability communication, which is developed and implemented in cooperation with stakeholders. What sustainability means in the museum sector is constantly being refined in cooperation with stakeholders. This process is also reflected in the reporting (Schaltegger 2014, 24–25). For museums, cooperation with the public and sponsors should be especially important here.

Just as sustainability can be defined as a search process, sustainability management is also an adaptive process, which not only has to adapt to new contextual conditions, but which is also – as a social process within the museum – never finished. The guiding principle of sustainability, unlike limits in the field of environmental management, is strongly related to the local context and the socio-economic framework conditions. External certification therefore quite correctly relates to the process of sustainability management itself. If such an external approach is to be applied and an orientation towards standards is sought, then certification of the sustainability management scheme itself can also be considered.

Transparency and credibility

A central consideration in sustainability reporting is the creation of transparency. This means the disclosure of activities and performance and is carried

out as a voluntary commitment through self-monitoring. It requires that reporting should be clear and should also take into account the principle of materiality (vgl. Kap.12.2).

Another question in the context of reporting is how credible sustainability reports are perceived to be. In the private sector, an external audit is often used to enhance credibility. This usually involves accountancy firms checking the accuracy, completeness and appropriateness of the content. In the museum sector, it is likely that this function could only be carried out by specialist sustainability advisors. To increase the credibility of the reporting without an external audit, it is above all advisable to address in an open way any goals that have not been achieved as well as any other failures or problems in the process. The inclusion of critical opinions from relevant stakeholders can be particularly helpful in enhancing the credibility of the report. Regardless of whether reporting is oriented towards external standards or not, it is essential that reporting is linked to internal measures. A one-off collection of key indicators for external communications cannot be called credible sustainability reporting (Brandl 2011, 396).

Choosing the format and parameters

First of all, a basic decision must be made as to whether information on sustainability performance should be integrated into other formats and reports, such as the annual report, or whether an independent format for sustainability reporting should be created. Since museums operate in different social contexts and different stakeholder constellations, sustainability reports do not necessarily have to be designed as traditional reports. The style of the reporting can therefore vary greatly. It can be based largely on an annual report, it can follow different reporting standards, or it can be more reminiscent of public relations documents.

Having such a degree of freedom also makes it easier to develop, in cooperation with other museums, a reporting format suitable for the museum sector and to professionalise reporting. In other sectors, too, the pioneering sustainability reports were often not very systematic and not structured according to the complex standards. For medium-sized and smaller museums in particular, it is easier to report on sustainability performance in a non-standardised format that they have chosen themselves (see Moutchnik 2014, 88).[6]

In addition to the reporting format, the content of the reporting must also be defined. In the early days of sustainability reporting, the focus was on environmental impacts, followed in the 1990s by social aspects, but today reporting is expected to address all dimensions of sustainability, including how they interact with each other (Bini and Bellucci 2020, 16). Sustainability reports in other sectors are increasingly evolving from reporting on activities to an "impact-oriented report on success" (Gebauer 2014, 135). If a logic model (vgl. Kap.5.1) has been created for the museum, it makes sense to include it in the report. A report that aims to depict sustainability as a holistic

approach must also always try to integrate the different topics within the report. The different aspects can be related to each other qualitatively. Ideally, however, the integration takes place at the quantitative level: indicators can be used to combine the key data from different thematic fields for this purpose (Moutchnik 2014, 86). However, sustainability reporting will probably never be able to cover all aspects of a museum's sustainability, as they are too diverse and complex. This inevitably leads to certain topics being omitted from the report and other aspects being emphasised. If this emphasis follows the principle of materiality, this can enhance the informative value and clarity of the reporting. However, a deliberate focus on selected topics can also be misused for greenwashing purposes (Schaltegger 2014, 22–23).

Defining goals and target groups

Sustainability reporting can pursue different goals. Of particular relevance is who is being reported to. The type of reporting, the scope and the information contained therein can differ significantly depending on the intended recipient. Subject to the goal and the importance of the recipient, it may also make sense to tailor reporting formats very specifically to the respective target group.

The first step is therefore to determine who the readers or the relevant target groups for the report are. The most important target groups for museum sustainability reports are employees, cooperating partners, donors and public bodies, and to a lesser extent visitors. Other addressees are associated bodies such as sponsoring groups or friends' associations, external stakeholders at local or regional level, the general public, sponsors and public authorities. It is essential to ask oneself what information is relevant to these target groups or what information they require.

In order to create a sustainability report that is tailored to specific target groups, it can be useful to work with "personas". This involves sketching out a typical reader for whom the report is being written. The relevant characteristics of this reader include their relationship to the museum and their values, their attitudes towards sustainability, their requirements and expectations of the museum and the report, and the specific media they use. Additionally, a direct dialogue with the target groups can be helpful. Based on this, an attempt can be made to draw up the report in such a way that it covers the often disparate information interests of different target groups as well as possible. However, it is important to ensure that in the attempt to meet all requirements the report does not become overloaded or difficult to understand. This is the balancing act required when producing sustainability reports (Clausen et al. 2001, 13).

Producing the report

A sustainability report communicates the mission and vision of an institution in the field of sustainability and presents the measures and results derived from them in a transparent and honest way. The report thus contains as a

minimum the strategic orientation and specific goals, as well as the measures and information on the indicators.

A sustainability report should include at least the following elements:

- Summary and key figures
  For stakeholders with little time, the most important results and key figures on the sustainability of the museum are presented before the actual report.
- Foreword by the director
  In order to give a sustainability report binding character and credibility, it should usually contain a foreword written by the most senior figure or figures. The museum's director should outline the importance of sustainability for the museum and its strategy.
- Profile and mission statement of the museum
  A brief description of the museum enables the reader to locate the reporting institution within the museum sector. Here, reference should also be made to the museum's sustainability mission statement. It is important to outline the strategic plans the museum is pursuing.
- Sustainability performance, key figures and tools
  This section is the main part of the report. The museum's sustainability performance should be presented using targets and key figures. The key figures should be explained comprehensibly and interpreted unambiguously. Based on this, the central building blocks of the sustainability programme for improving sustainability performance should be outlined. If sustainability management or other comparable programmes are used, they should be explained here, together with critical reflection on their detailed implementation in the museum.

In principle, the departmental areas within the museum can be used as to structure the main section. This has the advantage that the structure of the report can be derived and elaborated directly from the internal structure of the sustainability management system.

Open reflection and attractive design

Good sustainability reporting is characterised by a positive approach to how faults are handled. This means that inconsistencies and failures are openly communicated. For the presentation of integrated sustainability performance, the discussion of inevitable conflicts between goals on the one hand and synergy effects on the other hand is key. The way in which conflicting goals are weighed up or reconciled is important. The process is transparent if it includes a description of how the trade-offs are made and which priorities are set. The presentation of synergies is particularly important for stakeholders and for other museums, as such win-win solutions can motivate others to become active themselves. In general, examples that illustrate holistic solutions in a comprehensible way are ideal (see Clausen et al. 2001, 37–38).

A sustainability report should of course be professionally and attractively designed so that it is not put in the shadow by other external communications materials of the museum. In addition to graphics and tables for the presentation of data, quotes containing key statements and photos are suitable for breaking up the text and providing a look behind the scenes that conveys a real sense of the museum and its staff. Because a sustainability report is addressed to different audiences, the different reading habits of these stakeholders must also be taken into account. For the design of the report, this means above all that the chapters should begin with a short summary and be visualised using key figures.

Defining the scope and the medium

The principle of materiality should also govern the scope of the report. Despite the numerous and often widely differing expectations placed on it, the report should be focused on the essentials. In this respect, it can make sense to highlight one essential aspect in detail and omit others rather than to address many aspects only superficially (Clausen et al. 2001, 14).

Reporting to different audiences also means keeping reports short so that they are read by many stakeholders. A digital publication can be supplemented with more in-depth explanations and more detailed data, and can be accompanied by a printed summary.

Reporting can also be used as a starting point for a larger communication campaign on the topic of sustainability. Unlike in traditional public relations, agenda setting is at the heart of communications campaigns on sustainability. This means that the focus of communications is on social needs and problems and the museum's approaches to solving them. Social media is particularly suitable for agenda setting and can be used to address and involve stakeholders in any such communications campaign. Cooperation with media partners is a good way to extend its reach. The thematic focus on sustainability may open up new opportunities for initiating partnerships (Taubken and Dietrich 2011, 434–435).[7]

Determining publication frequency and estimating expenditure

In view of the extensive preparatory work involved and the resources required to produce it, an annual publication would seem very ambitious, even for larger museums. Another reason why an annual publication would not make much sense is that ecological and social problems can usually only be tackled over the long term. A good middle ground between continuous communication and practical feasibility might be a publication every two to three years.

Producing a sustainability report requires, first and foremost, that the employees responsible are given the time resources they need. In addition, the costs for professional design and printing, as well as external consulting if necessary, must be budgeted for. Involving stakeholders can also incur costs. The cost of producing the first sustainability report in particular is very difficult to estimate, as it depends not only on the general preparation of the

museum for the topic and the actual process of reporting, but also on whether data is already available or whether a data collection system is used at all.

External consultancy and the option of a review

In the corporate world, sustainability reports are increasingly being checked for credibility and quality by external consultants. This has also led to large companies in particular wanting to follow systematic standards and guidelines to ensure the quality of the report from the outset.

External advice on the preparation of sustainability reports can also be useful for museums. On the one hand, an external review ensures, not only for the management, but also for all stakeholders, that the report is credible, correct and complete. More generally, an external consultant can support the internal team carrying out the reporting during the preparation phase already and contribute to a general build-up of know-how in the museum. This can also cover upstream processes such as data collection, data quality and data processing. If there are challenges in this process, the reviewer can contribute ideas for solutions and, as an external party, discuss them with the various people responsible in the museum more easily than could an internal working group. This also facilitates the qualitative refinement of reporting in the long term.

Overall, however, the frameworks within which museums operate are different from those for private companies. Above all, financial interests do not play as great a role for museums as they do for corporations with their global supply chains; in this respect, it can be assumed from the outset that the credibility attached to museum reports is high. It also follows that an external audit, or an external orientation towards a systematic approach to reporting, is not necessarily essential, precisely because this could discourage smaller institutions from producing a report.

Good practice

Sustainability metrics and reporting

Bishop Museum, Hawai'i

When setting up sustainability metrics at the Bishop Museum, these were aligned closely with local and global sustainability initiatives to maximise impact and effectively contribute to a global collective. Throughout the development process, both the United Nations Sustainable Development Goals (UN SDGs) and Hawai'i's Aloha+ Challenge were reviewed. The Aloha+ Challenge is a state-wide public–private commitment to achieve Hawai'i's social, economic and environmental goals by 2030, based on the UN SDGs. From these frameworks, data already available within the museum's general operations as a priority (electric, solar and water) were reviewed and a baseline established for each metric. This baseline analysis of all costs and usages was invaluable for effective planning and prioritisation of projects going forward.

To effectively visualise the various metrics, a series of interactive dashboards showcasing the data were designed, accessible initially to staff on the intranet. These dashboards are filterable graphical user interfaces that show key performance indicators and summaries of data in an easy-to-understand way. These data allow easy understanding of the baselines and tracking of changes in response to sustainability initiatives on campus. This will prove useful in reporting for grants and annual reports at the Museum and there are plans to extend access to the dashboards to the public via the museum webpage in the near future.

After collecting and visualising utility data for these metrics, other metrics that fell within the local and global frameworks were included, which allowed for effectively tracking progress of ongoing sustainability initiatives at Bishop Museum. For example, in 2019, Bishop Museum pledged to be a plastic-free campus, installing six water stations, allowing staff and visitors to refill their water bottles while simultaneously eliminating the sale of plastic bottles. These stations have readouts counting the number of plastic bottles eliminated through their use. Monitoring this data yearly allows not only quantification of the reduction of plastic bottles on campus, but also identifies which stations are being used most frequently, enabling the museum to optimise the locations of our water stations.

The collection, tracking and visualisation of sustainability data have proven to be an invaluable tool for the Bishop Museum in its sustainability journey. The ability to graphically represent issue areas and see the positive impacts of initiatives has been integral to the sustainability efforts. Showcasing these dashboards to stakeholders, and eventually the public, helps bring awareness to the progress we're making at the Museum and within the community.

Contributed by
Christopher Hobbs

13.4 Reporting as an opportunity for the museum sector

Museums, like other civil society and non-profit organisations, are often of the opinion that their mission, which by definition includes a charitable purpose, is sufficiently socially responsible already. Their mission of preserving and collecting means that their social responsibility for future generations is also obvious – this is often the viewpoint. However, the tangible social impact of their tasks and activities is rarely recorded and demonstrated. This is why the demands on museums are changing: there are more and more calls from civil society and politics for museums to be held more accountable. Sustainability reporting is a good way to fulfil these demands.

Such demands emanating from civil society have already led to formal reporting in other sectors. In many countries, large companies and conglomerates are

now obliged, in their financial and corporate reporting, to include statements on aspects of sustainability. Even if this does not entail an obligation to produce a separate sustainability report, statements on sustainability and the identification of potential for improvement are required at the very least. Against this background, sustainability reporting is also becoming increasingly important for institutions in the public sector. However, special requirements must be taken into account here compared to reporting in the private sector (Brandl 2011, 393).

Reporting as a joint task for the museum sector

Sustainability reports serve first and foremost to transparently communicate the impact of museum activities. They are thus a means by which responsibility for social developments is assumed on a voluntary basis. In addition to their social mission as defined by their status as museums, museums can demonstrate additional positive social contributions through their sustainability reporting and can also demonstrate, for example, how well they use their funding (see Gebauer 2011, 408).[8]

Sustainability reporting offers many opportunities for museums. For example, it offers internal opportunities by supporting the development of strategy and the implementation of sustainability management in the museum. At the same time, it can increase social acceptance for the institution and help to meet stakeholders' expectations. For external addressees, sustainability reports also serve to embed museums more firmly in the city and region. By paying attention to stakeholders and demonstrating the museum's impact, reporting shows its rootedness in the regional context and can thus serve as a starting point for further cooperative activities.

Reporting can have an internal impact on the way activities and processes are carried out. Museums can thereby gain "directional certainty" and use reports as a key tool to support focusing their mission, work and staff on the guiding principle of sustainable development (see Gebauer 2014, 146).

However, the introduction of sustainability reporting in museums is much more difficult than in profit-oriented companies that have already been publishing reports for a long time. In order to institutionalise professional reporting, it is essential to build up organisational competencies and structures. Museums are often not in a position to do this due to the demands they face and especially the resources available. This challenge prevents many museums from even attempting to start reporting or communicating about the process and its results. For this very reason, other forms of communication which are easier to produce should be developed as alternatives to the sustainability report (Pollhammer and Meixner 2016, 39). Even if quantitative reporting is the aim, it is still preferable to start with purely qualitative reporting rather than not to publish a report at all (see Gebauer 2011, 421). And if even if a qualitative report is not feasible, information on sustainability performance can at least be incorporated into other external communication formats.

Introducing reporting in museums

For sustainability reporting by museums to be successful, social responsibility needs to be at the core of the museums' self-image. Precisely because they already assume social responsibility by virtue of their role definition, museums face a different horizon of expectations in their reporting than do profit-oriented companies. Because of their role, they are also called upon more than profit-oriented companies to act in an ecologically sound, economically responsible and socially just manner. In addition, they often operate largely on the basis of taxpayers' money. Economic sustainability in the sense of sensitive and efficient budgeting is therefore a central aspect of sustainability reporting and SMM (see Brandl 2011, 401).[9]

Even though reporting is only one component of strategic sustainability management, its importance must not be underestimated. It is often argued that the implementation of measures is more important and external communication merely an additional option if time and resources allow. This overlooks the fact that reporting can be an important driver for the overall process on account of its data needs, overarching requirements and fixed deadlines (Brandl 2011, 403).

It is particularly important for museums to take a leadership role in sustainability reporting, because if museums and other public sector institutions ignore this issue, visitors and other stakeholders may get the impression that sustainability is not a socially relevant issue. However, reporting by museums provides the public and stakeholders with starting points and ideas for sustainable lifestyles in the private context (see Dumay et al. 2010, 533).[10]

In the future, sustainability reporting will also serve to enable comparison and comparative evaluation between museums.

And such reporting will not only communicate general sustainability performance in a transparent way, but also the fulfilment of voluntary, sector-internal standards or initiatives. In this way, museums can illustrate good practice and thereby motivate other institutions to join them in making their operations more sustainable. Through exchange and mutual inspiration, this can create significant momentum that can contribute to the transformation of the entire sector.

The goal for the museum sector is for sustainability reporting not to be a non-binding communications tool for public relations. Rather, it should become a binding instrument that creates transparency regarding the sustainability performance of the entire sector.

Notes

1 Based on research findings on change management.
2 Derived from recommendations on the governance of small and medium-sized enterprises.
3 Based on sustainability management in small- and medium-sized enterprises.
4 Referring to general approaches to sustainability reporting.
5 Analogous to CSR reporting for municipal bodies.

6 Drawing on experience with CSR communication in other sectors.
7 Drawing on experience of CSR communications in municipal bodies.
8 On reporting by municipal organisations.
9 Based on success criteria for municipal organisations.
10 Based on recommendations for reporting by public organisations.

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