DESIGN SYSTEMS IN GOVERNMENT

Design Systems in Government

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INTRODUCTION

SECTION 1

INTRODUCTION

The digital society is characterized by, among other things, citizens' interactions with government on all levels through digital channels such as websites and mobile apps. In many societies the private sector is moving faster than government in terms of delivering services digitally, and so the government can often feel lagging in terms of the usability benefits of digital service delivery. A key area here is the deployment of well-thought out, and consistent design principles. Governments have for a long time been working in silos, and the mindset of even considering the user experience (UX) in digitization and policy making is something that has only started to take root more broadly within the past two decades or so.

But governments around the world are catching up. Little by little, services are not only digitized, but the fundamental promises of digital delivery, such as easy self-service, flexible and manageable user journeys and less data input through improved sharing, are increasingly being realized by delivery teams. As an interviewee from the Netherlands mentioned, there is an increasing awareness in governments, that they have the same 'customer' in the citizens, and accordingly have to act and look as one government. This was also the underlying mission for the other design system stewards interviewed for this research. As a part of this is the thinking that underpinned the Government Digital Service (GDS) in the United Kingdom (UK) in the early days of that organization, which was about making digital services so good that people prefer to use them. In order to maximize the benefits for users, and streamline workflows for delivery teams, governments are, along with private tech companies in many countries, looking to deploy design systems.

Much has been said about what design systems are, and how they are set up. But there is less information available on how design systems are planned, developed and maintained in the government context. Through qualitative interviews and a global survey, we have gathered the experiences of design systems teams in governments, and will present their learnings in this report. The occasion for this

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[1] *Fresh Look Is Due In Federal Design (https://www.nytimes.com/1973/02/12/archives/fresh-look-is-due-in-federal-design-longrange-program-gathering-of.html, Rita Reif, 1973)*

research is the establishment of the Japanese Digital Agency in September 2021, and their efforts to setup a design system for the Japanese government, but hopefully our research will help other government practitioners around the world as well.

SCOPE, INTENDED READER AND STRUCTURE

Scope of the Research

The research does not cover how design systems look - the what - around the world, as this is the easiest thing to find out by oneself. We will only provide a definition for the sake of common understanding and delineation. Instead, the scope of the research tries to cover the how and the why of design systems in government.

Intended Reader

In this report we collect and synthesize international government design system experiences, and provide a wide range of stakeholders inside and outside of government, with a reference document, they can use when thinking about their own work in relation to the design system. Through the research, it became clear how varied the kinds of stakeholders and relationships surround a deployed design system, and so it is our hope that this report is broad enough to provide value to as many roles as possible.

Structure of the Report

This report is structured around three phases: Planning, development and maintenance. Each of these is given a section, within which we aim to largely cover the same areas. The areas we specifically look at are policy around the design system, user research, team management, external resources and management frameworks.

After each section, we have summarized some key learnings to follow up on and take action on. However we realize that people reading this report will be at different stages in their design system journey, so we have divided the learnings into 'early' and 'progressed' in order to help orient the reader towards the things they might benefit from thinking about first depending on where they are.

ABOUT THE RESEARCH

Data collection for the research has been done through desktop research, quantitative and qualitative methods. The authors have made efforts to record the experiences of government design system teams at different stages of development.

Qualitative Research

The authors would like to thank the following interviewees, who kindly made their time available. Executive summaries of the interviews can be accessed in the Research Data Document available online along this report. References to interviews made throughout this report are all referring to interviews with the below interviewees as noted.

Tim Paul, Government Digital Service (UK)
- Research Data Document page 8

Anders Guldmann, Danish Agency of Digitization (DK)
- Research Data Document page 9

Nicklas Colerick, Danish Agency of Business (DK)
- Research Data Document page 9

Josh Tumath, BBC (UK)
- Research Data Document page 10

Tina Linné Olsen, Danish Public Pension ATP (DK)
- Research Data Document page 11

John Mirland, Danish Agency for IT and Learning (DK)
- Research Data Document page 12

Angela Imhof, ICTU (NL)
- Research Data Document page 14

Victor Zuidweg, ICTU (NL)
- Research Data Document page 14

Pablo Rocella, Fmr. Ministry of Modernization (ARG)
- Research Data Document page 15

Peter Alexander, DTA (AUS)
- Research Data Document page 16

Scott Cass-Dunbar, DTA (AUS)
- Research Data Document page 16

Quantitative Research

The quantitative research was done by sharing an online survey (TypeForm) in a global community of design practitioners in August and September of 2021. We obtained 33responses in total from people in 10 countries. 16 respondents were users of a design system, and 14 were developers of a design system. 18 respondents of the 30 in total, work in government, with at least 11 of these working on the national level.

The survey itself was relatively thorough with multiple open-ended questions, so while we saw many would be respondents drop-off, we did receive very thoughtful and useful answers from the people who went all the way through. The survey data can be accessed in the Research Data Document available online along this report.

WHAT IS A DESIGN SYSTEM

Design systems can be defined and summarized in many different ways, but at their core they can be said to be an agreement between designers and teams on how their products and services should look and feel. This often refers to a digital context, but is not necessarily limited to this.

The idea of atomic design[2] has become a common way to conceptualize design systems, in the way designs are broken down into constituent components which only need to be agreed upon and designed once. The more such components can be defined and reused, the less effort it requires for users to navigate new sites within the same domain, and designers and developers too can focus on higher order problems, rather than potentially having to recreate the same building blocks again and again.

Depending on various factors such as size and goal of the organization, the capacity of the design and development team and the needs of the users, design systems can range from static PDF documents to open, interactive libraries with fledged out code examples and even patterns of interaction. Adjacent to a design system might also be a style guide with content guidelines for different channels and media. In government, all this means potentially showing a unified across channels, which can help citizens navigate public services better.

So the basic idea of the design system is relatively straight forward, but as we have examined in the present research, there are many stakeholders and things to consider when moving from the idea of a design system to deploying one in a government setting.

[2] *https://bradfrost.com/blog/post/atomic-web-design/ (Brad Frost, 2016)*

Design Systems in Government

A design system in government is fundamentally the same as a design system in a private company, even though the context is different.

But even as similarities do exist, in many cases, government, through its various branches, delivers a much broader spectrum of services than most private companies do through much more dispersed teams. Additionally, this happens within the vertical context of government, i.e. the relationships between national/federal, regional/state and municipal levels. Then there are aspects such as hiring practices, in-house design and IT capabilities, political as well as managerial buy-in, which all shape how government design systems are planned, developed and launched.

When examining design systems in government, it is also important to recognize the fact that governments are set up differently around the world. Services are not necessarily delivered by the same kind of organization across government functions, and the reach and authority of a government design system is also very much depending on the context it is in.

Fundamental User-Orientation

Whether investigating the vision behind, or mission for, a design system, or looking into the mindset that enables design systems to deliver the intended value, it is clear that most people will talk about a fundamental orientation towards the end-user.

Speaking of design's role in government more broadly, Ben Terrett, the head of design of the GDS when it was established, mentions in a talk called "From Persuasion to Usability"[3] how a dedication to user needs ultimately helps an organization make better decisions. As a manifestation of this thinking, a design system is in a way an investment in an organization's continuous dedication to user-centricity. This is happens, because as the design system is developed and adopted, more or less definitive answers are agreed upon to many different questions. Questions, which if teams were to answer them on their own each time, might be answered from a different perspective than that of the optimal end user experience. The design system is a way to align designers and service delivery teams on the user experience, that they as an organization are pursuing.

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[3] *From Persuasion to Usability (https://www.youtube.com/watch?v=_20Xik6JijQ, Ben Terrett, 2015)*

PLANNING DESIGN SYSTEMS

PLANNING DESIGN SYSTEMS

INTRODUCTION

Many of the design systems we have examined in this research, were started as small side projects that then grew over time. This was for example the case for Argentina, Denmark and the UK. This means that the design system was not sold or implemented as one big all-encompassing system, but rather took root from the bottom of an organization, where the need for a design system was directly felt and acted upon.

The connection to reality is an important point to be made here, as planning a design system from the top could potentially prove a limitless endeavor. To prevent overthinking and over-planning it, it is important to work closely with the people who need the design system and will use it, to understand what it should minimum cover in order to be valuable for them.

SITUATING THE DESIGN SYSTEM IN POLICY

There are many ways for teams to situate a their design system in policy making. Working from the bottom up, in the case of UK, they made a fully functional prototype. They failed early through iterations outside of purview and were unsupported and unfunded, which gave them both freedom to find out what would work, but also pressure in terms of constraints on available resources. In Denmark they collaborated with two potential user-organizations of a design system, to show what they design system would do and how it could be implemented. From there the case was made to expand and consolidate, which meant anchoring the design system in the Danish Digitization policy, as a necessary component to deliver the digital services the strategy called for. This was a way to cement the design system in not only the decision maker's mind, but also provided additional trust and authority to the effort, but we will get into this further in Section 3.

In the Netherlands they have chosen a different route altogether, which is about taking a bottom up approach to the planning of their design system. They have engaged with 100s of stakeholders across government, to create a community that can create a design system organically.

In Argentina, the government design system and the team around it was transferred from the municipal government of Buenos Aires, which provided a different kind of starting point than the above mentioned examples.

In the case of private organizations too, design systems can grow from existing initiatives and slowly be built out. This was the case at the BBC in the UK, where it started as an incubation project and expanded gradually after several ideas had been tried out.

Common among all these examples is that the design systems were situated in policy by the power of example, and then nested in an owner organization as the need for and worth of the design system was proven and widely understood.

Ownership and Initial Funding

A recurring theme when discussing design systems, is the focus on continuous funding. In the case of Denmark, funding comes from several different agencies, while it is centralized in the UK for example. Apart from the fact that this has implications on how smooth budgetary negotiations might proceed, there is also a deeper issue about how people understand the role of the design system. The issue being that to people not directly involved with development or implementation of the design system, it can seem that the design system at a given stage is "done", meaning it does not need continued maintenance. A learning regarding this point from GDS that Ben Terrett talks about in "From Persuasion to Usability", is the clear authority and control of design given to the place in charge. This is a justification for design, which the design system will equally benefit from across government organizations.

With regard to the issue around funding, it was a highlighted in both Denmark and the UK, that securing funding through involvement of senior stakeholders would have been good, because it otherwise can be hard to sustain the effort, in the sense of securing permanent funding. Because when funding becomes a ritual as the design system grows, even if more funding was gradually secured, people around the design system making funding decisions got used to it being on a funding-when-needed basis. This has implications for longer term planning and maintenance efforts. In relation to this, being quick and clear about measuring and communicating the sustained value of a team is a key step to take in this direction.

The approach that has been taken in the Netherlands is to aim for a disconnection between the people paying for the design system and the delivery and user community. It is very open approach, which admittedly also takes more effort to get off the ground.

We will touch upon this in section 4, but suffice it to say here, that in the Fall of 2021, the Australian Digital Transformation Agency (DTA) has chosen to cut the design system from their activities, because it was exactly deemed unnecessary to continue central maintenance. Instead, the user community is expected to take over, with the DTA keeping an eye on how things evolve. This is a good example of the design system being situated in, and then transformed by policy.

Relationship Between UI and UX

The user interface (UI) and user experience (UX) are closely related, but not the same thing. Decisions around the relationship between the two can be tough to make consciously, but there are implications for how the design system develops. To put it simply, deciding to unify the UI across all government digital touch-points is a massive endeavor. With different tech stacks, a changing political landscape or simply weak enforcement mechanisms, it is less about designing the UI and more about implementing and maintaining it. As was the experience in Argentina, for example, delivery teams would reference the central design system, but then proceed to change the components so much on their own, that the design system as a common denominator ultimately began to loose relevancy. The GOVUK design system delivered by the GDS is a famous example of a consistent and wide-ranging unification of UI.

On the other hand, unifying UX is about accepting that the UI will never be completely aligned across all services, and instead aim for a common way of using the government's digital products. A simple example could be that it matters less what color the button is, and more that it sits in a predictable position and works as expected across services. On the Australian Government Design System homepage it is clearly stated as a principle as "Consistent, not uniform"[4]

Similarly in Denmark, the design system is more about proliferating similar logics, rather than necessarily a unified UI - which because of individual branding etc is a very difficult task. The cultural and political landscape plays a role here, because if the culture and tradition is geared towards more local autonomy in service delivery, it becomes harder to convince teams to implement and sustain a central design system. This challenge was articulated in our interview with the Dutch team, when they discussed the "not-invented-here"-syndrome, where people are instinctively suspicious of things imposed from the outside.

Whether a design system team chooses or is tasked with pursuing a unified UI or UX, fundamentally they have to push for a widespread understanding that to the end user, it does not matter who is in charge of a delivery team's service journey,

[4] Design Principles (https://designsystem.gov.au/about/)

but rather it matters that the journey is easy to navigate and feels recognizable throughout.

PREPARING FOR ADOPTION

Design systems work well when implemented broadly, but this requires adoption. This can be achieved in many ways. Fundamentally a design system can be either mandatory or voluntary, with each path having advantages and disadvantages. Voluntary adoption has the advantage that it is easier politically to roll out, but it requires a lot of selling in the initial phases. The Netherlands is a clear example of this, with their tough struggle to convince people to bet on a central system outside of their own immediate control. But on the other hand mandatory implementation is not a guarantee of success either. Even if political backing for a broad roll out of the system can be secured, regular enforcement of the implementation (and updates) and user-support has to be implemented, less the system should be left to develop in diverse directions as was the case in Argentina.

Understanding the Ecosystem

Knowing what the ecosystem looks like that the design system will be deployed in, is an important first step in preparing for adoption. Especially in terms of setting realistic goals, and having an idea of which places to count on for quick wins. In Denmark this was by establishing cases with the board of IT and learning as well as the public pension provider ATP. It is the case in all the government teams interviewed for this research, that the larger government organizations, for example the tax office, are so big that they have their own design system or way of doing things in place.

There is very little to be done about this in terms of forcing them to change. Rather, it seems to be the case that peaceful co-existence and thriving should be striven for. In the case of GDS for example, they try to create alliances and befriend people in the big departments. In process they call 'upstreaming', things move slowly to the GOV.UK site from departments.

They key learning here is that whatever the political circumstances around the system may be at a given point in time, it is essential for the team responsible for the roll out to have strong connections and trustful relations to at least some of the main user agencies, in order to be able to plan and coordinate the implementation strategy necessary.

PREPARATORY USER RESEARCH

User research in relation to design systems is about testing whether components and patterns work and what is needed down the line.

In the planning stage of the design system, it can be tricky to gauge what kind and how much user research should be done. As with planning in general, user research can take forever if we let it. In the UK, preliminary user research was done by making some interactive prototypes to test their assumptions on what might be needed. Tim Paul, the head of interaction design at the GDS and leading the design system effort, worked in different departments before coming back to GDS, which meant he knew the needs of the people delivering services. This anecdote gives a sense of what kind of understanding it takes to move decisively towards a design system, in that it is less about user research as a checkbox, and more about a vivid and authentic understanding of how the design system might fit into and contribute to the work of delivery teams.

That being said, the GDS is also famous for their research based component designs and explanations, which help lend a strong air of authority around why components and patterns look and work like they do. But a lot of this work actually flows into the design system from the user community, and as we will dive into in the following sections too, this community is of great importance to the continued success of a design system.

Community and User Research

In 2016 GDS held an event[5] to discuss design systems across government. At this event, different government agencies came together to share what they were doing, what challenges they have and agree to work together. This was an example of building community very early on, and aligning people around the central design system which would launch later.

This was also where they realized that they were mature enough to begin thinking about collaborating. Maturity here, refers to a shared understanding of and capability within frontend development.

Similarly, in the article "building a large scale design system"[6] it is outlined how the US went through the process of getting major ministries/agencies into one room to discuss needs and challenges.

[5] *Looking at Design Systems Across Government (https://designnotes.blog.gov.uk/2016/12/21/looking-at-design-systems-across-government/, Tim Paul, 2016)*

[6] *building a large scale design system (https://18f.gsa.gov/2017/10/03/building-a-large-scale-design-system/ , Maya Benari, 2017)*

It's basically a preliminary audit with people from the relevant departments, and this can be done using digital tools like they did with analytics.usa.gov or manually. The point is that community creation and early stage user research can go hand in hand, and lay the foundation for future success.

SETTING UP THE TEAM

In "Designing a Systems Team"[7] on the design systems consultancy company EightShapes blog, co-founder Nathan Curtis writes about four stages of growth for a design systems team. The four stages make up an easily approachable model and can be summarized as follows.

1) Spare timers. Here people are making small experiments, but often face barriers in terms of up take. The Netherlands fall in this group, but really it is how most of the teams have started.

2) Allocated individuals. This is were people have some time carved out by their managers to work on the design system. As we shall see, this is how many teams continue to work. Denmark is an example of this, with people from the two main sponsoring agencies putting their own people in, plus allocating budget to hire and a full time outside consultant.

3) A dedicated team. This requires more funding and management buy-in to sustain. GDS is the standard for this. In the case of Argentina, because the team was transferred whole sale from an existing setup, they also began with full-timers.

4) System team-of-teams. This is a complex endeavor for complex organizations "spanning an umbrella of multiple interrelated teams to accomplish system goals". Curtis does not mention the government context here, because government is perhaps more fragmented than being able to sustain a team-of-teams. Rather, as we will see repeatedly, the organizing principle in government is more organic with greater emphasis put on scaling through a community of contribution.

[7] *Designing a Systems Team (https://medium.com/eightshapes-llc/designing-a-systems-team-d22f27a2d81d, Nathan Curtis, 2017)*

In another post, "Team Models for Scaling a Design System"[8], Curtis writes about how a single person can be in charge, a centralized team can be in charge or a federated model can be adopted where people from different departments pitch in. In the context of government, the single person is not a realistic option, and it is not something we have encountered in our research. Instead, we can look at the split between centralized and federated models. The main difference has to do with attitude towards community contribution. The centralized effort might be easier to setup and control, but the team will have a hard time pushing for adoption from where they sit. Instead, in the federated model, control is traded for scale, adoption and relevancy - but it requires trust and commitment. As the experiences of for example Denmark and GDS show, investing in this through community efforts and focus, is what it takes to move from centralized to federated.

Initial Roles on the Team

When the team is initially formalized around a design system, the most common roles we heard mentioned were designers and developers. In "Designing a Systems Team", Nathan Curtis describes how design and engineering are must-haves, as these can more easily cover for the other roles than vice-versa.

In our survey, of the four in-house answers to the question on roles on the team, a more nuanced picture arose, with a team in Canada having a bare-bones setup of 1 UX designer, 1 developer and 1 product manager, while a German team reportedly has 31 people across multiple roles already in the planning stage.

When reading the survey answers, we should be mindful of how the stakeholder constellation around and relationship to a design system can vary a lot depending on the context.

Current Stage	Country Name: Type of belonged Organization (Respondent's)	UX Designer	Content Designer / UX Writer	Project / Delivery Manager	Performance / Business Analyst	Developer	User Researcher	Technical Writer	Community Manager	Product Manager	Accessibility Lead
(1) Planning and Experimentation before Launch	Denmark: Public Sector		2	5	4				3		
	Germany: Public Sector	5	2	4	5		4		2	4	5
(2) Development before Launc	Denmark: Public Sector2	2	1	1	1	2				1	
	Romania: Design Office/ Freelance	1	1								
	Canada: Public Sector	1				1				1	

Figure 1: Roles on design system teams in the early stages.
Source: Research Data Document

[8] *Team Models for Scaling a Design System (https://medium.com/eightshapes-llc/team-models-for-scaling-a-design-system-2cf9d03be6a0, Nathan Curtis, 2015)*

USING EXTERNAL RESOURCES TO GET GOING

Of all our interviews only Denmark is hiring external development help. This of course creates a pressure in terms of in-house capability development. At the GDS in the UK, they considered getting outside help in the beginning but decided against it in order to keep ownership internally.

Of the survey respondents who reported working with design systems from within government currently in the planning stage (four), everyone said they had used external resources in the form of either an external design agency or freelancers, with two out of four using an external agency, and three out of four using freelancers.

External resources can be used in various ways, from developing the brand identity, to development, content design and user research.

We will examine more closely the relationship between community and third-party developers in the section 3 part on community management, but suffice it to say here, the external developers can in certain government contexts become key players in disseminating best practices in all relevant government agencies. This happens when a lot of hands-on experience with the design system lies in external hands, and so these professionals become key actors in community creation as the design system gets adopted.

The key learning here is to be aware of who interacts with the design system in what way, and welcoming their input in the most beneficial way.

Country Name: Type of belonged Organization (Respondent's)	Collaborating partners	(1) Planning and Experimentation before Launch	(2) Development before Launch	(3) Launch and Operation	(4) Maintenance and Expansion
Denmark: Public Sector	External Design Office	●			
	Freelancer / Independent Contractor	●			
Germany: Public Sector	External Design Office	●			
	Freelancer / Independent Contractor				
Denmark: Design Company/ Freelance	External Design Office	●	●		
	Freelancer / Independent Contractor				
Romania: Design Office/ Freelance	External Design Office				
	Freelancer / Independent Contractor	●	●		
Canada: Public Sector	External Design Office				
	Freelancer / Independent Contractor	●	●		
India: Design Office/ Freelance	External Design Office				
	Freelancer / Independent Contractor	●	●	●	
United Kingdom: Public Sector	External Design Office				
	Freelancer / Independent Contractor	●	●		
United Arab Emirates: Private Company	External Design Office				
	Freelancer / Independent Contractor	●	●		
Germany: Design Company/ Freelance	External Design Office	●	●		
	Freelancer / Independent Contractor			●	●

Figure 2: Which teams work with what kind of external resources

Source: Research Data Document

APPROACHING DEVELOPMENT

Developing a design system is a big topic in and of itself, and we will in this report not delve into technical aspects such as tech stacks or collaborative design software. Instead, what we enquired about in our research was ways of approaching development such as audits and prototypes.

Audit

Denmark started with an audit. There was a design manual before, but it was outdated. They reviewed and collected efforts to understand the potential for a design system in the Danish context.

In the UK, the GDS started with audit as well. This was done in order to get data on which to make decisions around prioritization. Through the audit, they ended up with a backlog of things they were pretty sure people needed, and the backlog is essentially a discussion page, which also feeds into their transparency efforts.

The tangible aspects of an audit covers the need for components and contents, in relation to the kind of content that is being put out by the delivery teams. But within the idea of an audit is also embedded a thorough look at who is responsible for what in on the user side - this point links back to the relationship between community and user research. The promised value of a design system will not be realized from one central office, but rather through a broad adoption with a dynamic give and take relationship. For the work of adoption to be made easier, relationships has to be built in through an auditing process that is as much about involvement as it is pure research.

Prototypes

Working with prototypes instead of documents is encouraged by design teams all across the world, not only in relation to design systems. But in the case of design systems in particular, encouraging and enabling prototypes with the available components, styles and patterns is a way to deliver the promised value. For example on the Canadian Digital Service website, they write the following:

> *❝ Prototypes are a risk-reduction strategy and an excellent change management tool. They allow everyone reviewing them to experience what users will experience, and design accordingly. If you're using interactive elements within some of your content, it's much easier to understand how everything works together when you're working from a prototype rather than a document. ❞* [9]

Prototypes are often misunderstood to be a deliverable, or something to be worked towards. Instead, it can be useful to think of them as a medium, like a sketch on paper, which will help to think of them as valuable assets as development progresses. In the early stages of the design system, working in prototypes have the added value of enabling the team pushing the effort, to show what things might become through implementation, rather than having to have the would-be users imagine on their own how things would work after adoption.

Roadmap for Support and Maintenance

Having a plan for how to approach support and how to set up a contribution mechanism is crucial for long-term sustainability. This also includes feedback mechanisms, because the design system team is often located centrally, away from the delivery teams. Argentina had a different approach in that they moved out, and were more hands-on with the delivery teams as they needed it.

But again the difference in context plays a role. In the Netherlands for example, because of the restrictions on available resources in terms of funding and people, they have chosen to go the way of an existing design system solution and deliver it as white label instances with design tokens. The design tokens work by defining what parameters can be adjusted and what they should be called. So instead of saying a button is red, it is defined as 'main color', which then gives room for localized branding to an extent. This is similar to the thinking of UX consistency. They can not do their own development, so they let other organizations develop their preferred components which are then fed into the larger system. This is the central mechanism in the community-led approach. In pursuing this approach, there is also the fundamental recognition that the community is what eventually have to carry the design system forward in terms of scale and maintenance.

[9] *Co-Design With Deciders (https://blog.canada.ca/2021/05/10/codesign-with-deciders.html, Digital Transformation Office, 2021)*

Scope of Government Design Systems

As mentioned before, the government setting poses a different context to develop and implement design systems within. Particularly relevant in this regard, is considerations on scope of design system in terms of who will use it, how they will use it and what kind of community is needed to sustain it.

In our survey of design system users, a majority of respondents belong to the national level of government. And the design system teams we talked within our interviews, similarly all have a focus on unifying the experience of interacting with national government services. Whether it's the UK single-domain strategy, or Denmark's portal-site strategy, the line is drawn at the municipal level, meaning the design system is not enforced or supported on that level. They are open-source, so the best practices defined through central government efforts can be adopted on all levels if the need and drive was there, but we did not hear of any such efforts.

Coverage

In our survey, we found that a majority of respondents use the design system for websites and self-service solutions. This means that the kind of components and patterns covered are also confined to these areas. A design system can consist of many things, but typically they consist of component designs and a complementary codebase. A content style guide might also be part of it, but can also be seen as something independent of the design system. In GDS in the UK, the style guide for content is separate from the design system, and is maintained by a large team of content designers.

What do you use it for?

18 out of 34 answered

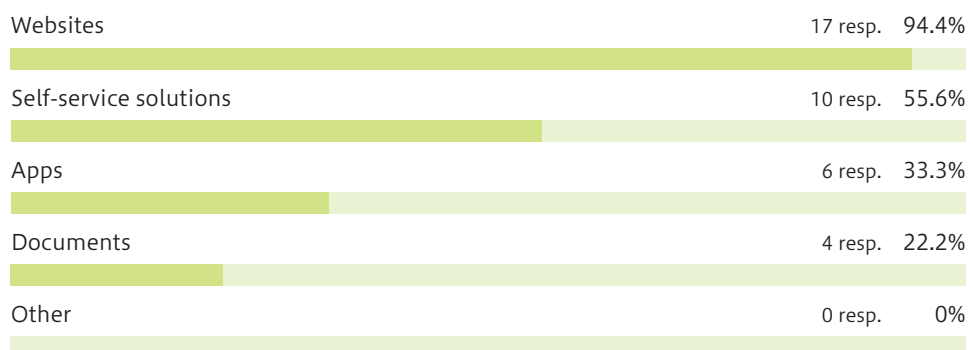|		
Websites	17 resp.	94.4%
Self-service solutions	10 resp.	55.6%
Apps	6 resp.	33.3%
Documents	4 resp.	22.2%
Other	0 resp.	0%

Figure 3: What design systems in government are used for.
Source: Research Data Document

Setting up a community

We briefly touched on the relationship between preliminary user research and creating connections in the community the design system will be situated within. But community was frequently highlighted as essential for success in our research. For the GDS, for example, the connection was made between contribution and scaling early on. They also realized that they are one step removed from service delivery, and so they needed to design a feedback cycle from the actual services to the design system. This allows them to scale the design system with quality. The degree to which GDS not only manages their community, but also publishes their findings, establishes them as a front runner in this regard in particular.

It is clear when we step back and examine interviews and desk research, that we can conceptualize communities on different levels, each with their own role to play with regards to a government design system.

- Community of practice
  In GDS they have guilds as communities of practice.
  (https://www.gov.uk/government/publications/community-development-handbook/community-development-handbook). The community of practice spans government along specialized job titles or responsibilities such as design researcher, content designer etc. While perhaps not contributing directly to the development of the design system, they do help in the vital aspect of propagating common language and ideas among departments necessary for sustained commitment to the design system.

- Community of Interest
  Participation in international forums such as international design in government community (http://international.gov-design.com) which was established by the GDS in 2017, or the Design Systems Slack community (design-systems.slack.com), created by the design system thought leader Jina Anne.

- Community of Users (Delivery)
  People who actually have to use the design system to design and develop services. This can be working groups in departments or ministries, such as The Danish Board for IT and learning maintains with external consultants, the Heartbeats events in the Netherlands where people learn together, or the Design System Collaboration Forum (https://digst.dk/digital-service/brugeroplevelse/brugerpanel/) co-hosted by the Danish Agency for Digitization and Business Agency. Through a conference 3-4 times a year, where all stakeholders and user groups come

together to discuss direction, user testing and development. This could for example be discussing or stressing what kind of components are needed when.

- End-users (Citizens)
  The people who have to use the services that has been designed with the system. In Denmark the Agency for Digitization, which is half responsible for the Danish government design system, maintains a volunteer citizen panel to gather feedback as needed (https://digst.dk/digital-service/brugeroplevelse/brugerpanel/)

The importance of community around design systems can also be seen in the SparkBox Design Systems Survey 2021[10] (referred to in the following as 'the SparkBox Survey'), where the design systems deemed very successful by their teams, see 30% of their users "often or always contribute to the design system". On the flip side of this, however, is the fact they found 54% of in-house respondents saying "design system users rarely contribute to the system or don't contribute at all".

But what was particularly interesting was how there was varied success in nurturing the community, and how that energy was directed towards the development of the design system. The GDS is famous for active communities of practitioners (UX researchers in government, designers in government etc.), and they were also quick to encourage community participation in developing the design system through a contribution system. But the management of this community was something that had been done ad-hoc in the past, and was only recently systematized with a community manager. Community management can easily fall in the category of ad-hoc tasks that other specialities can do on the side. On the other hand the Netherlands is taking a community-first approach, where they build the community before the design system. But regardless of the timing, it has been clear that it is not enough to open up and encourage contributions, if there is not a robust (and transparent) system in place for evaluating, implementing and giving feedback on them. We will examine this mechanism further in the next section. In the case of Denmark, they do encourage contributions, but it can feel like a one-way street, with little feedback going back to the user, according to an interview we did with a user of that particular design system.

The key learning here is that it is important to draw up who can and should participate in the design system community, how it's managed, what the channels are and what the benefit of the community is. The specific setup should be thought out and justified in the context particular to the design system.

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[10] *Design System Survey (https://designsystemssurvey.seesparkbox.com/2021/, 2021)*

Key Learnings

To summarize this section in brief, we can highlight the following learnings.

Early

E-1. Communicate clearly about expectations around UX and UI consistency.

E-2. Build on the power of example to show the benefit early on.

Progressed

P-1. Have a framework in place to work with learnings from user tests from the community, and deploy these in design decisions.

P-2. Have everyone on the team understand and reflect on what the path forward for the design system looks like, and how their roles might change going forward.

DEVELOPING DESIGN SYSTEMS

DEVELOPING DESIGN SYSTEMS

In the previous section we looked at the planning of design systems in government, and what can be done at this stage in relation to the various areas needed to make it successful. In the following section we will look at the development stage, and how the efforts of government teams who have so far undertaken design systems evolve as the initiative progresses.

POLICY TO GET THE DESIGN SYSTEM OFF THE GROUND

In the general introduction, we covered the role of design in government in general and in the planning section we looked at how a design system can be situated in policy through the power of example.

Moving into the development stage, we can take a look closer to the ground around the areas to be aware of.

Examples and Documentation

In the multi varied context of government, with different ministries progressing at different paces, with different technology providers and different levels of in-house knowledge, expecting a common technology stack is difficult. It is generally accepted that it is impossible for a central team to support all the possible tech stacks in the wild. Instead, they focus on providing code examples in easy to read and easy to adapt ways. The design system documentation becomes place of reference, and the balance to be struck between how things should be done versus how they could be done, is something which grows out of a mutually respecting relationship between the team and community.

In the UK they deliver examples in the language HTML or Nunjucks, while in Denmark they make examples available as Plain JavaScript code that is as universally readable as possible. In the case of Denmark, they propose it as a best practice, where they present things in a way they know to work. This reduces exposure to third party frameworks, and allows for the use of optimized solutions.

Just like the coding examples, components can also be presented in different ways. In the case of GDS, they only present the components as rendered code, whereas in Denmark they supply .svg and Figma files for the component library, so designers can work in their preferred software, but interestingly it is pointed out that the source of truth is the online components library and not the design files.

A note on examples and documentation. Both from interviews and our survey, it was clear that among users one of the biggest issues was with documentation (or lack thereof), with documentation for example being too simplistic or static. Many users of design systems work in the environment every day, and rely on documentation to meet design system requirements. When this feels lacking or incomplete, ripple effects are created that can hold up development for a period of time.

Accessibility

The wide adoption of accessibility standards have also driven a new wave of user-centricity, or a reminder, that things should be verifiably usable to as many people as possible. Accessibility is an area in which design systems play a crucial role, because the design system becomes the main point of reference. If the main point of reference is living up to accessibility standards, the proper implementation will cascade down through the system. But even if accessibility can seem like an obvious good outcome, it is not always clear what expectations to match. In the case of Denmark, they have to follow EU regulations, and in the UK, accessibility for government websites is prescribed by law.

Accessibility and code examples are also interlinked, in the sense that for example screen readers will work better with proper code, which is another argument the GDS uses to consider using their code instead of simply making a solution look like the real thing, with messy code behind it.

Trust and Authority

Trust in the system is crucial. Trust in the sense of authority of the system to be readily adopted. Documentation and very clear and transparent reasoning are keys here. But also trust in funding and vision. The Netherlands are struggling with exactly this, as the design system initiative is neither rooted in a specific ministry, nor continuously funded. So they have a hard time asking the community to sign on and do the heavy lifting required to adopt a central or outside-of-home design system.

USER RESEARCH DURING DEVELOPMENT

The role of user research changes as the design system and its community develops. In particular there is a consideration around what kind of testing it makes sense to do where. As new components are finished, it does not necessarily make sense to test them out of context, but this in turn necessitates a smooth process for the community to feed back their user test results into the system.

There were subtle differences in how teams went about research on components. In Argentina the design system team did project-agnostic (end) user tests of patterns, while in UK and DK for example, the (end)-user tests are conducted by the individual service provider using the design system to create their services. This ensures that components are tested in context, but in the case of GDS, it puts a lot of pressure of documentation on the contributors, since they have high standards for describing the reasoning for components for example.

They key learning here is that testing can be done in different places, but that there should be a framework in place for learnings from the tests to benefit everyone and make the system better. Being able to explain the why of every design decision is one of the intangible, but essential, keys to making a flourishing and solid design system.

CHANGES IN THE TEAM

It is clear that the needs of the design system team changes, as the system matures in both scope and adoption. Particularly in terms of community management for example, but also in terms of how people put their skills to use. As the focus shifts from initial development to launch to maintenance, the support aspect and the building up of procedures around this becomes very important as well. In the GDS it was estimated that the design team spend about 60% of their time on support, 20% on contribution management and 20% on feature development on their own. It is important to be mindful of this change in how the team will operate. The key learning here is to make sure everyone on the team understands the likely path the design system will take, and have them be ready to adapt.

It is interesting to note that in our interviews with government teams, the team size is quite steadily around 10 people, because if it gets any bigger it becomes better to break it up.

Avenues for Expansion

As development progresses, the team is naturally expanded.

In our survey of teams, we asked what kind of roles they were looking to add to the team in the near term. The roles we asked about were: UX designer, contents designer, project/delivery manager, performance/business analyst, developer, user researcher, technical writer, community manager, product manager and accessibility lead.

As can be seen in Figure 4, early on there is more of a need to add UX designers, content designers and project managers, whereas the need for for example accessibility leads and community managers becomes more urgent as the system is pushed out and more specialization is needed to maintain a certain level of quality.

The community manager is in charge of the intangible stuff like running community events such as meetups, and making sure contribution guidelines and the like are easy to understand and work with.

Similarly, the accessibility lead is working on training people in how to think about accessibility, and make it an effective part of their workflow rather than an afterthought.

Current Stage	Country Name: Type of belonged Organization (Respondent's)	UX Designer	Content Designer / UX Writer	Project / Delivery Manager	Performance / Business Analyst	Developer	User Researcher	Technical Writer	Community Manager	Product Manager	Accessibility Lead
Planning and Experimentation before Launch	Denmark: Public Sector		1	2					1		
	Germany: Public Sector	3	2	2	2	2	2	2	2	2	2
Development before Launch	Denmark: Design Company /Freelance										
	Romania: Design Office /Freelance	1					1				
	Canada: Public Sector	1	1			3	1		1	1	1
Launch and Operation	New Zealand: Private Company	1									
	India: Design Office /Freelance1		1						1		1
	Canada: Public Sector		1		1	1			1		1
	Canada: Public Sector										

Figure 4: Roles teams want filled at different stages of development.
Source: Research Data Document
Note: In the Figure, "5" corresponds to "5 people or more"

RELATIONSHIPS WITH EXTERNAL RESOURCES

In many or most government settings, private suppliers are a key part of the digital government value chain, simply because the necessary development resources are rarely if ever available in house at all levels of government. But this also puts the onus on the public servants ultimately responsible for the user experience, to have private suppliers follow the agreed upon guidelines - including the design system.

One issue could be private suppliers using the design system to make a solution look like an official solution, but using their own codebase beneath it. As mentioned above, this can relate to accessibility in a very real sense, since the private supplier' codebase might not support screen-readers as well as the publicized code in the design system.

As it is rare that design systems can be enforced through legal means, promoting and managing implementation through contracts and specifications are more common. This is for example clearly the case in Denmark, where the development is outsourced. The way they make it work, is to have clear and authoritative competencies in-house, to manage, direct and involve the external suppliers. It comes down to communication in the sense that needs and specifications must be clearly communicated, so suppliers know what they have to work towards in terms deploying the design system. The concrete learning from the Danish experience in this area is, to at least have people with a deep understanding of UX on the in-house delivery teams, so they can carry the responsibility of working together with and facilitating the know-how of the external suppliers as it was related in our interview with the Danish Agency for IT and Learning.

Involvement

Here, an important point around culture emerges. The above way of collaborating works best, when people across organizational boundaries agree on and respect a higher purpose outside of each of their agendas. In terms of developing the best possible digital public service offerings, this goal is to "simply" work for the citizens and improve government. A key to achieving this, is to involve not only external-to-government resources, but also external-to-design system team resources. Involvement can create ownership and mutual understanding, which is crucial to underpin the small, intangible tasks along the way towards implementation of the design system. The point is, no matter how good of a communicator someone is, there will be exceptions, cracks and gaps between different parties' understanding, and the best way to fill these is with good faith collaboration with a common purpose.

LAUNCHING AND MANAGING THE DESIGN SYSTEM

On the following pages we will look into two aspects particularly relevant to the launch and management of the design system: adoption and contribution. In relation to adoption, it is relevant to look at the kind of strategies deployed in the government context, to have agencies in other ministries implement the design system. In relation to contribution, it is interesting to see how, following the points mentioned previously about community, a constructive give and take can be facilitated.

Adoption

Adoption is of course a critical aspect of the success of a design system. Adoption can be mandated centrally through the law, as has been the case in the UK and Argentina, or it can be optional but advised. In the case of Denmark, where the design system is pushed out by agreement, and not by law, the effect is that there is a certain lag between roll outs of generations across government websites. It can take quite a while for individual agencies to have the capacity needed to overhaul their presence on the web to adhere to the new generation of the design system.

Some adoption initiatives are easier to begin with than others. For example in Denmark they do education days for developers to boost awareness and have an "open door policy" which allows people to book a one-on-one meeting with the people behind the design system to go through how they might use it. Similarly in Argentina, they had a very hands-on approach to adoption, by pairing design system people with relevant counterparts in the delivery organisations. In doing this, they could together understand the needs and evaluate the components required.

In the Netherlands they have run into what was described as "Not Invented Here"-syndrome, which sums up the resistance the design team face when trying to rally and align stakeholders around a common solution. This challenge highlights the importance of involvement, and creating a community feeling, where stakeholders can contribute to make the design system better as they deem necessary. It is also a double challenge in the sense that as with most, if not all, governments, there are many different tech stacks across governments, and there is a substantial cost associated with adopting new ways of doing things or refactoring existing solutions. Concretely, the Netherlands are holding regular "Heartbeat sessions", to create awareness and a sense of unity in the community that will ultimately carry the design system forward.

Another insight around the beneficial prerequisites for adoption, is a thorough understanding of UX in the user-organizations. This was a clear, common thread in all interviews on rolling out the design system, from UK to Denmark to Australia, having a receptive user-base makes it much easier and efficient to push the idea of the design system. A comment from the Argentinian experience highlights this point, as they faced the challenge of having to explain the importance of information architecture and interaction design to delivery teams in government agencies, where basic understanding of new web technologies, trends and standards could be lacking. To counter this they focussed on templates to make users in the delivery agencies lives easier, and combined with the above mentioned one-on-one support system, they operated a spectrum of assistance, from simply reviewing what someone had made with the design system, to testing the implementation with for example screen readers to see if it met the standards, to helping understand the design system and how to use it in the first place.

Managing Contributions

It's all about the realization that contribution is not a failure in the sense that you're not good enough. You have to create an atmosphere of winning together » *- Tim Paul, Interview*

When looking at contributions, it is clear that having solid workflows to manage them is essential so as to not be overwhelmed. Workflows such as the one highlighted in the blogpost by Suzanne Scacca called "Tips for Maintaining Your Design Systems"[11] around the approval process, or Brad Frost's "A Design System Governance Process"[12] offer an overview and a point of departure to examine what is needed to be set up upon launch. Especially in government, with the potentially multi varied stakeholders, it is conceivable that there will be a lot of requests and questions. Having a clear, robust and transparent funnel to guide these through is essential to keep clearheaded as a team.

In the UK they have a set of criteria to assess contributions, and they use those same criteria as a team as well, in order to avoid double standards. This makes it easier to manage, and also increases transparency.

You need to control the flow of changes, whether they come from scheduled audits in an organized internal fashion, such as by regular reviewing server contracts or supplier contracts, or are noted continuously by the team and the community.

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[11] *Tips for Maintaining Your Design System (https://www.telerik.com/blogs/tips-maintaining-design-systems, Suzanne Scacca, 2020)*

[12] *A Design System Governance Process (https://bradfrost.com/blog/post/a-design-system-governance-process/, Brad Frost, 2019)*

In the "Discuss a design challenge: How to use and contribute to the GOV.UK Design System"-video[13], GDS community manager Imran Hussain highlights how one of the things the GDS has found about the contribution process, is that contributors want to have more information about the entire process and how long it will take. They found this out by doing user research. People know that there is a contribution system, but there is no clear mental journey of the process. For example people often do not take into account the guidance that has to be written around a proposed component. In order to alleviate this issue, they are looking at communicating more about standards of design, coding and accessibility. This aligns very well with the findings in the Sparkbox survey of 2021, which found a correlation between the perceived success of a design system and the perceived degree of definition and clarity of the contribution process.

Organising around Approvals

In the article "Taming Design System Chaos"[14], Henry Daggett states that design systems need clearly defined governance and contribution systems, in order to track requests and decisions. Daggett notes that the contribution processes is a learning process, as teams have to get used to it. So there is necessarily an arc in how it should be dealt with, as opposed to being entirely planned out and set up from the beginning.

At Societe Generale, they considered a core team, but opted instead for a Design System Council, so as to not have the rest of team feel excluded. There is a balance to be struck between consistency/authority and input/creativity, and though active involvement this balance can perhaps be struck more fairly. The idea behind the council is that membership is fluid, and depends on who has time to join and contribute to the tasks of mission setting and overview.

The GDS has a Design System Working Group[15], and in Canada they practice what they call "co-design with Deciders"[16] . In a blog post of that name, they describe a case where they created travel guidance during the corona crisis with all involved agencies. Again we see the importance of involvement among stakeholders, as the design system is not necessarily a given in terms of the value add. It has to be followed up on and supported.

[13] *How to use and contribute to the GOV.UK Design System (https://www.youtube.com/watch?v=IIt0fwJkhE8v, GDS, 2021)*

[14] *Taming Design System Chaos (https://medium.com/societe-generale-design/taming-design-system-chaos-66bcadbf43e1, Henry Daggett, 2020)*

[15] *Design System working group (https://design-system.service.gov.uk/community/design-system-working-group/, GDS, -)*

[16] *Co-Design With Deciders (https://blog.canada.ca/2021/05/10/codesign-with-deciders.html, Digital Transformation Office, 2021)*

In the GDS working group they have representatives from different departments that does quality assurance, as they are close to the teams actually doing the delivery. The team works with development of new features, by sending one new thing to review in the working group every month. They look at it for two weeks, and then say yes or no with feedback, after checking back with all their departments. But even if they get a yes, they still have a lot of work to do in terms of adjusting the system to the new component. This is not just about adding to a list, but maintaining harmony in the whole.

Adding new components

In addition to the contribution workflow, internal workflows for adding new components can also be streamlined. In "User-centered Design System Resources"[17] it is explained how Lyft has a templated workflow for new projects/components. This include a brief, an audit document, a Figma design file, ongoing review deck, guideline document and handoff resources. Solidifying the development process like this, ensures that it is easier to onboard new members. Communications are a part of this too, in the sense that stakeholders get briefed along the way, so there are no surprises. The whole process can take up to a month.

While the example from Lyft comes from a private company with an organization centered around a common goal or purpose, there is something to be said for that way of working in government too, as the experience from the UK shows with their being adamant on transparency and openness, which is founded on a solid workflow behind the scenes.

THE USER PERSPECTIVE

At this point we should like to mention the users of the design system, and present what sorts of issues they typically face in interacting with one, or the perceived benefits they get.

Interviewing users of the design system in Denmark, offered a glimpse at the reality of government design systems from the other side of the fence. Through our survey we found that government design systems are typically used for

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[17] *User-centered Design System Resources (https://medium.com/tap-to-dismiss/user-centered-design-system-resources-2df958d90749, Evan Maeda, Matthew Spiel, Jeremy Dizon, Runi Goswami, Michael Yom, 2021)*

websites, which also includes online self-service solutions. Depending on the progress made in each national context, the breadth of design system adoption will change. In Denmark, which has one of the most digital governments in the world, a lot of public services are offered through self-service portal sites virk.dk for business and borger.dk for private citizens, which redirects to services offered by ministerial agencies or municipalities. In this case the design system is meant to cover the work in developing and sustaining these self-service solutions.

The government agencies and independent government organizations using the design system, have delivery teams with designers and developers and sometimes use outside resources too.

ISSUES

Interviews with users and results from our survey suggest that the following issues are fairly common when interacting with government design systems.

When we take a look at what issues design system users in our survey highlight, it is clear that they resemble the points made previously in relation to what design system developers should be aware of. Except for the design system being too static, and that it changes too often, all the others can be mitigated through better involvement of the user community.

What issues or challenges do you experience around the design system?

16 out of 34 answered

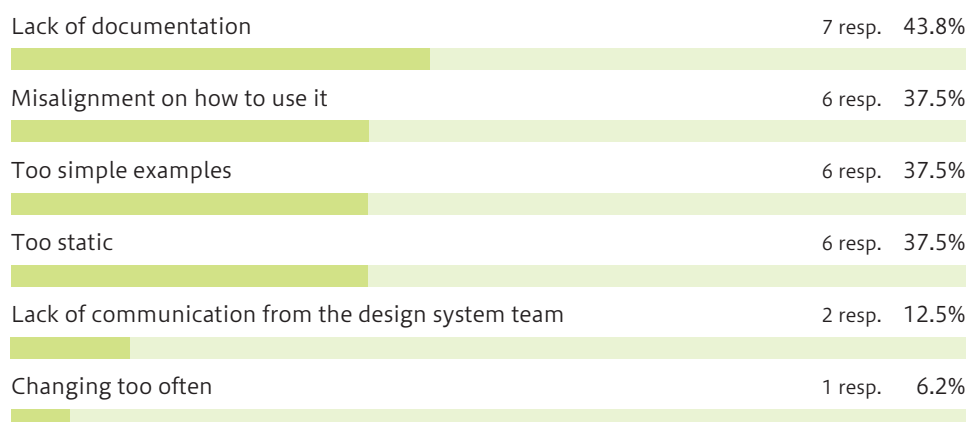|		
Lack of documentation	7 resp.	43.8%
Misalignment on how to use it	6 resp.	37.5%
Too simple examples	6 resp.	37.5%
Too static	6 resp.	37.5%
Lack of communication from the design system team	2 resp.	12.5%
Changing too often	1 resp.	6.2%

Figure 5: Issues and challenges users of design systems experience.
Source: Research Data Document

On the other side of this coin, a user in Denmark mentioned how internal coordination in the user organization is also something to be considered. Particularly in terms of how teams deal with what is missing in the design system. Different schedules means different tolerance for suggestions and updates. In this particular organization's case, in the early days they maintained a document internally to keep track of how they had worked around missing components themselves. As the design system matured, this document was slowly dismissed. A closely related point was made in a follow up session with a respondent from our survey, where they pointed out the fact that documented components can seldom cover all potential use cases in a service journey by saying that "···you need to take things a stage beyond what's documented and can either forge your own path or try to find the work of other people who forged theirs.". These variations are not always shared back to the central repository, and so part of the benefit of having a design system in the first place, to avoid reinventing the wheel, falters if the community can not learn from itself continually.

A user in our survey added the following point about design systems being too simple or lacking in relevancy by saying: "My understanding of too simple examples of design systems are that they often have the usual most frequently used elements of UI such as text boxes with labels and hints and alt text, or radio buttons in a stack with labels. But design systems need more than that: We now expect things like graphs and illustrations. How should they be laid out?"

A clear and transparent workflow for contributions was also mentioned by users. One example highlighted related to who signed off on contributions to the design system in which contexts. Any sort of unclear directions or unknowns, lurk like a dark cloud of extra work over the contributions process, and could potentially discourage well intentioned users from contributing. In relation to this it was mentioned how responses on for example GitHub can be very quick, and indeed lead to a constructive dialogue, but could sometime lack a conclusive "Yes, you can do X".

In conjunction with this point about the design system being treated as a done thing, the risk from a user perspective is that they will not be properly supported, and so when it becomes a chore to use the system rather than a help, user organizations might slowly begin to build their own and abandon the central design system. An issue between users and the design systems team that we heard about from an organization in the UK, that relates to implementation, is how some teams might agree to adopt the design system, but would like to recreate their existing UI in the new setup - and adapt components accordingly. This creates potential offshoots that the design systems team must manage diligently, or else see the design system loose its potency in the long run.

The use of the design system can be seen on a scale, from active community participation to simply using the design system to do one's job. In our survey we found that, perhaps naturally enough, most people fall in the latter category. Being involved with design systems from a developer perspective, might create a sense that they are endlessly fascinating. But there was a comment from a user in Denmark about how they, as a professional UX designer, are simply using the government design system as a tool that they want to make better through contributions, and are not otherwise interested in or reading about design systems on their own.

A user in Denmark mentioned how they typically look at examples of the components in action, since the component out of context is rarely very useful. In that sense, the design system can also be conceptualized as a best practice library. This clears some, but definitely not all, of the pressure of having to enforce its use.

How would you characterize your own participation in the communityaround the design system?

18 out of 34 answered

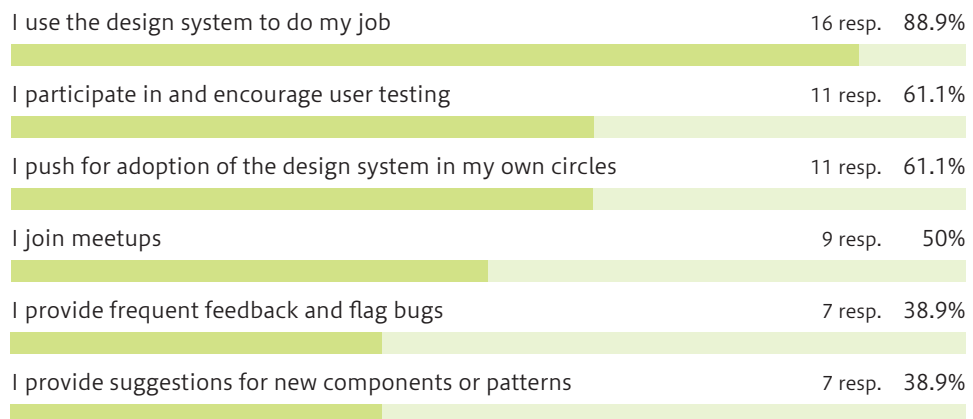|		
I use the design system to do my job	16 resp.	88.9%
I participate in and encourage user testing	11 resp.	61.1%
I push for adoption of the design system in my own circles	11 resp.	61.1%
I join meetups	9 resp.	50%
I provide frequent feedback and flag bugs	7 resp.	38.9%
I provide suggestions for new components or patterns	7 resp.	38.9%

Figure 6: How users of design systems characterize their participation in the community around the design system.
Source: Research Data Document
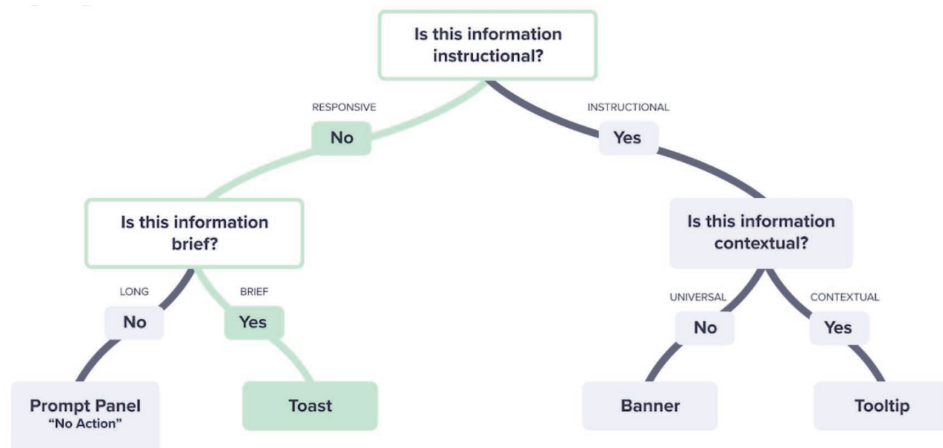
Screenshot 1: A decision tree around a design system component
Source: https://medium.com/tap-to-dismiss/user-centered-design-system-resources-2df958d90749

Overall we might say that there is balance between enthusiastic use, reluctant use and avoidance. As long as there is no legally binding framework to force adoption on all agencies, there is a pressure on design systems teams to encourage and enable adoption. As the GDS frames it, the design system is a service, and this frame of mind enables developers to ask questions about how they might go about helping their users the most.

In the previously mentioned article from Lyft, they provide advice on some initiatives which are meant to make following the design system as easy as possible. They have internally developed plugins for Figma, that for example that checks whether a design conforms to color, typography etc, and another to easily check dark mode compatibility. And they also have a decision tree feature (Screenshot 1) on their component pages, where design system users can easily get a sense of whether that specific component is actually the most appropriate for their needs.

BENEFITS

After looking at issues and uses, it is also interesting to look at what kind of benefits users of government design systems perceive. It was confirmed through both interviews and surveys what users value most in the design system.

In our survey, saving time was the biggest value gained, and this was confirmed in our interviews as well. A user of the Danish design system specified how they don't have to spend time on basics every time, and so can use time on developing more complex solutions and user testing of these. Reusing components saves time for developers too.

The fact that in modern design systems, accessibility is baked in from the beginning is also a huge bonus, because then designers and developers can feel confident that their room for error is minimized. In the same vein of the benefit of standards like a design system, being able to roll out new technology standards consistently and speedily is a major plus for particularly larger organizations.

The benefit of smoothened communication within and outside one's team is interesting, as it mirrors the sentiment of having a common frame of reference.

Other benefits that has been mentioned throughout the research process includes scalability in terms of organization, consistency in design across dispersed teams, better product outcomes, cheaper production time, raising quality, increasing speed to launch and deployment.

What value do you get from the design system?

18 out of 34 answered

Saves time   18 resp.   100%

Makes it easier to consider accessibility   14 resp.   77.8%

Helps smoothen out communication with other teams   11 resp.   61.1%

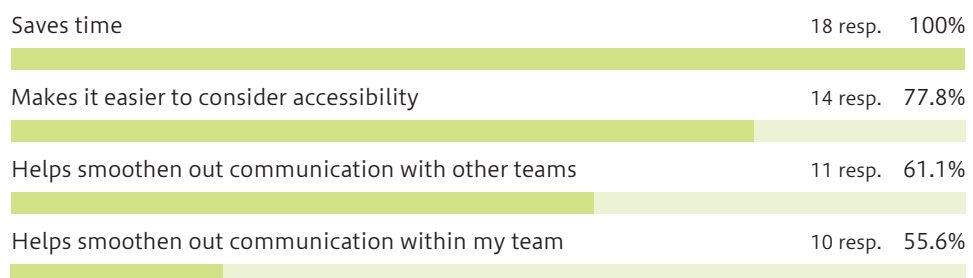Helps smoothen out communication within my team   10 resp.   55.6%

Figure 7: Value users experience from the design system
Source: Research Data Document

Key Learnings

To summarize this section in brief, we can highlight the following learnings.

Early

E-3. Map out the communities to engage with, and who to start with.

E-4. Reflect on how everyone, both internally and externally involved, can win.

Progressed

P-3. Work towards enabling use by considering the technology and design literacy of users of the design system.

MAINTAINING DESIGN SYSTEMS

MAINTAINING DESIGN SYSTEMS

INTRODUCTION

Once a design system has been set up, there are multiple things to consider in terms of maintenance. Maintenance of design systems covers many varied aspects, and they are all essential to continuously reap the benefits of having the design system in place. We will approach this through the lens of the topics previously covered.

POLICY FOR SUSTAINING THE DESIGN SYSTEM

After launch the system must be adopted. Depending on the size of the user base using the design system, this can be anything from easy to daunting.

Maturity

In the Sparkbox survey, it was found that perceived success relates closely to tracking metrics. They kind of metrics they track are usage, adoption, accessibility, efficiency, engagement, usability and consistency. However it is not mentioned how these metrics are tracked, and this is exactly a difficult area as mentioned by GDS, but also underlined in the creativity needed in approach to measurement of for example adoption by Nathan Curtis in his talk "System of Systems"[18] at User Experience Lisbon in 2020, where he presented a dashboard in a spreadsheet where they track teams across an organization and their status in terms of adopting the design system.

They look at which stage they are at on a 0 (non-adoptor)—4 (using all system code and adopted everything they can) scale, and they also list names of stakeholders (developer lead, design lead) of the different products, so they know who their customers are, as he puts it.

[18] *System of Systems (https://www.youtube.com/watch?v=Elpt1i9QIdU&t=476s, Nathan Curtis, 2020)*

In the "User-centered Design System Resources"-post on Medium, current and former design system team members at Lyft detail how they work with adoption of the Lyft Product Language. One of the things they do, which creates a similar kind of understanding to what Curtis outlines, is to conduct design system engagement surveys in order to gauge aspects such as awareness, value and ways of usage. in the Netherlands they are also actively considering how to measure maturity levels in terms of adoption across of design systems instances even though they are still at the beginning of their process.

Corey Roth, in his 2020 blog post "A Design System is not a Sticker Sheet"[19] mentions UX maturity as a way to approach measurement of organizational progress in terms of design system roll out. As a measure it can for example work by looking at whether the goal of delivery organizations is mostly centered on ensuring consistency on known UX problems - things that has already been solved in the discipline of UX. If this is the case, the UX maturity can be said to be low.

Screenshot 2: Nathan Curtis presenting how adoption can be tracked in an organization.
Source: https://www.youtube.com/watch?v=Elpt1i9QIdU&t=476s

[19] A Design System is not a Sticker Sheet (https://uxdesign.cc/a-design-system-is-not-a-sticker-sheet-caeac93f896a, Corey Roth, 2020)

Transparency and Publicity

Transparency was highlighted among our interviewees as being important in terms of creating trust towards the organization delivery the design system. But this transparency can be achieved in different ways depending on the context. For example, the GDS is famous for their public blogs, where even the CEO publishes new strategy on a blog.[20] Meanwhile, in Denmark there is little writing on public blogs. One reason for this was suggested to be the need in Denmark being less, because government is smaller than in the UK, where they need buy-in from broader and further reaching organizations.

Issues

In our research we enquired about the issues facing development teams in the later stages of a design system, and it was interesting to see how the issue of funding, which played a big role in our qualitative interviews, is not chosen among the design system developers in our survey.
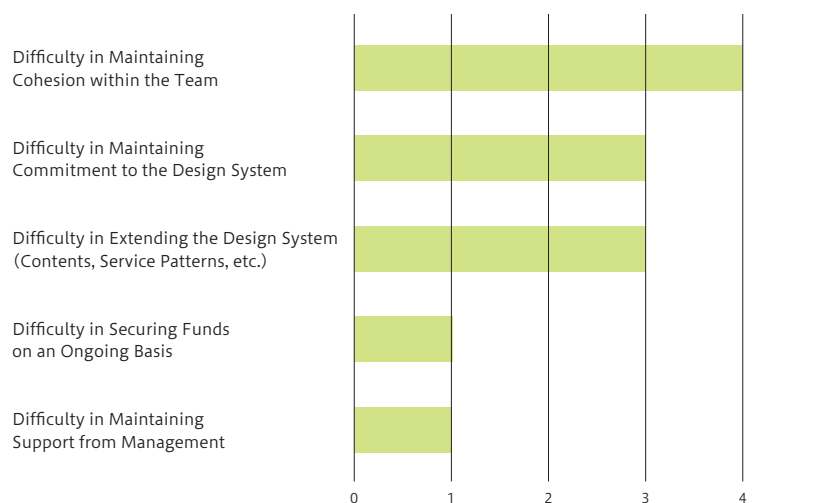
Figure 8: Issues that design systems teams experience
Source: Research Data Document

Funding

Both UK and DK mentioned how there was a risk of political decision makers allocating budget away from the design system once it was "up and running". But the design system needs to be continuously maintained and developed, as all our interviewees told us.

In a 2020 video titled "Measuring the value of the GOV.UK Design System"[21] Tim Paul talks about how they found that the GOVUK Design System saves the UK government over 17m GBP a year, by working with assumptions around usage. These savings stand in relation to what it would cost government to deliver similar quality without a design system. In the same video, it is mentioned that the focus should not be on efficiency and cost-saving, but rather on service quality.

Consistency vs Innovation

The issue of service quality for a design system can be examined through the lens of consistency or innovation. Consistency implies a heavy emphasis on what works, and making sure that clear guidelines are followed. Innovation implies the adoption of new ideas or ways of doing things in relation to for example components or patterns. Neither is necessarily better than the other, but it is instructive to see how different approaches are taken on around the world. For example, in late 2021, the Australian Digital Transformation Authority was transitioning into a role of providing strategy and direction, rather than being in charge of delivery. The design system was cut due to this transition. The reasoning behind it is, that the maturity in delivery organizations (the agencies) has come to a point where they can maintain and develop the system themselves. Up until that point, the DTA had had an agile coaching function, coding solutions and making sure agencies were working better. As this has succeeded, the DTA needed to evolve.

The design system might suffer in terms of consistency, by being "cut loose", but on the other hand it might open it up to innovation by being entirely community driven. They will keep an eye on how it develops. It is a departure from how GDS is thinking about their system, as they are prioritizing and expanding a permanent in-house team to support efforts. The GDS believes the design system has to walk the fine line between consistently and innovation, in the sense that the design system should not change all the time so as to be considered unreliable (see point about trust, steadiness and the burden of updating), but on the other hand it should evolve as users' needs evolve. You have to become tolerant of a certain degree of inconsistency, because you have

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[21] *Measuring the Value of the GOV.UK design system (https://www.youtube.com/watch?v=eSkVtSEAe98, GDS, 2020)*

to compromise. It is a healthy mindset to think of your efforts as part of a bigger ecosystem that has to thrive. A winning together mindset.

What is particularly instructive about this split in approaches towards organizing around consistency or innovation, is the role of the central team to lay the foundations and enable the community to take the reins further down the line. As has been mentioned before, the maturity level in delivery organizations play a huge role in determining basically what the central digital-team (and subsequently the design system team) should be working on and how.

TEAM SETUP FOR THE LONG RUN

We were told by the team in Denmark how important it is to not be overly reliant on a single person to drive or manage the design system. This can be said for many types of organizations, and it aligns well with the critique leveled at the solitary design system team setup by Curtis, as mentioned on page 16-17.

As noted in the previous section, the team structure and tasks changes over time. With more and more time being used on support, as time goes by. Here it might be pertinent to relate a point brought forth by the GDS, where it was stressed that designers are not standardized away, but rather freed to make service design. That is to say, as the design system goes online and good workflows are established around contribution and meaningful updating in relation to the organizations' needs and new technological opportunities, designers become not less but arguably more important, as they can focus more time on creating the services that will eventually use the design system for better user outcomes.

Depending on how the team and organization is set up, there tends to be a movement towards the design system team doing more super visionary work, community work and support work, than actual development. Developers are still needed to advance the code base, and designers should manage the direction of the design system. But as the system matures, these things will take up more of their time.

When the design system has been launched and adoption is promoted, it becomes increasingly important for the design system to work 'in the wild' to have managers and employees in the user-organizations, who can firmly and confidently make the case for the design system, and lead negotiations around the implementation efforts. This is a concrete learning from Denmark.

The team at Lyft mentions an initiative they have undertaken to ensure smooth onboarding for design system members: "Shortly after newly hired designers and engineers learn about Lyft's culture and get their tech environments set up, they take Mobile and/or Web system onboarding labs (mini design/engineering projects overseen by onboarding mentors). These labs help new hires learn: What assets and resources live in the system, how to use existing system assets (and how to adapt them), how to communicate and collaborate with cross functional team members and where to get help". All part of an important internal process for smoother team building over time.

DECISIONS AROUND EXTERNAL RESOURCES

Remembering the 'everyone wins' mindset, it is more beneficial in the long run to work diligently with existing and potential users, and be flexible around their needs. In the Danish agency for IT and Learning, for example, they have a working group with members of the different external suppliers and consultants they work with. As mentioned in the previous section around involvement, they have a forum to discuss technical as well as design-related decisions and planning. This is a sort of trust-based stakeholder-management scheme in which the implementation of the design system can be done in the most meaningful way. As the design system moves into a maintenance and expansion stage (the Danish design system is at its 7th generation), relying on strong relationships to maintain commitment and enthusiasm rather than being forceful and hostile seems to be the approach that the teams behind the longer established systems of the ones we researched (DK and UK) have taken.

Managing community for scalability

This last point also leads to highlight another big learning around managing community, which is being able to support it in a reasonable and trustworthy way. Users in Denmark mentioned how the design system team can being slow to respond, but they simply do not have the manpower. We heard from the BBC how they see a need for a community manager, to take over the tacit or invisible tasks that otherwise fall on designers and developers.

Through the contribution system, a majority of new components are not made by themselves, but rather by active members of the community, which in turn makes them very eager advocates for the design system in their departments. So there is a positive feedback loop between successful contribution and increased adoption.

Through the contribution system, a majority of new components are not made by themselves, but rather by active members of the community, which in turn makes them very eager advocates for the design system in their departments. So there is a positive feedback loop between successful contribution and increased adoption.

Being stern but frank with the community of external suppliers can be a decisive factor for the smooth, continued support of the design system in the long run. In Denmark, for example, where there is a reliance on external suppliers as previously mentioned, it can be seen how consultants move from project to project, and are used to working in the government's design system. They in turn create a community to be managed for the successful scalability of the design system, not only as the people implementing it, but the people pushing for updates and new contributions.

UPDATING DEVELOPMENT AND MANAGEMENT FRAMEWORKS FOR FUTURE SUCCES

Expansion

Finally we can take a look at expansion. The design system, as mentioned elsewhere can cover many things. It was interesting to hear from the GDS, with the UK being in the forefront of design system efforts in government, talk about which avenues for expansion they are exploring going forward. There seems to be general agreement about how design systems evolve from components to patterns of interactions to service patterns. Basically it is the notion that standardization can cover more and more of what government does, until it reaches the point where people are free to work with people, rather than working on the systems.

In the 2015 article "Roadmaps for Design Systems"[22], Nathan Curtis writes: "Don't discount the power of an effective, concisely communicated system roadmap. It generates awareness, discussion, faith that you've got your act together, and trust that what you do provides for what they need."

This is an important point, because it refers to trust in the system from other teams. Strong communication, which roadmaps are a part of, show that the system will not go away and that someone is in charge.

When a roadmap, or other strong communication is absent, it can be detrimentally to the long term success of the design system. We heard how the Argentinian team never put too much effort into community building or communication. There was a newsletter intended to inform about development in the design system, but it was not interactive and ultimately not enough to galvanize a community to sustain the design system. They did have a roadmap for new components and support for mobile apps, but as this roadmap was not maintained, it lost its meaning over time.

[22] *Roadmaps for Design Systems (https://medium.com/eightshapes-llc/what-s-will-your-design-system-deliver-4b81d41be0d4#.vc22hyavl, Nathan Curtis, 2015)*

Key Learnings

To summarize this section in brief, we can highlight the following learnings.

Early

E-5. Be conscious of what the design system should ultimately enable in terms of service design.

Progressed

P-4. Consider the mid to long term needs of the design system, and engage decision makers about how to go about making this happen.

P-5. Expand and encourage community to enable the core team to be nimble and forward thinking.

FINAL WORDS

CONCLUSION

SUMMARY OF KEY LEARNINGS

Here we present a summary of the key learnings as they have appeared in the report. Although we divide them into two groups, there might still be something to be gained from considering all or most of them, no matter what stage a design system is in. However based on the interviews and survey conducted for the present research, we believe somethings are perhaps more important to turn to earlier than others.

Early

E-1. Communicate clearly about expectations around UX and UI consistency.

E-2. Build on the power of example to show the benefit early on.

E-3. Map out the communities to engage with, and who to start with.

E-4. Reflect on how everyone, both internally and externally involved, can win.

E-5. Be conscious of what the design system should ultimately enable in terms of service design.

Progressed

P-1. Have a framework in place to work with learnings from user tests from the community, and deploy these in design decisions.

P-2. Have everyone on the team understand and reflect on what the path forward for the design system looks like, and how their roles might change going forward.

P-3. Work towards enabling use by considering the technology and design literacy of users of the design system.

P-4. Consider the mid to long term needs of the design system, and engage decision makers about how to go about making this happen.

P-5. Expand and encourage community to enable the core team to be nimble and forward thinking.

FINAL WORDS

Looking back at our research and this report, it is clear that more has been said about the early stages of building design system in government, than the latter ones around maintenance. This might be due to several factors, including the simple fact that established, long-running government design systems are not as readily available as one could have hoped. And even as design systems are launched and implemented, the figuring-out-what-to-do still continues.

There is also the point that, as design systems are launched, adopted, supported and maintained, it is the things stressed early on - such as community, transparency, documentation, team building etc. - that ultimately carries the design system through the times, even if these areas are manifested differently as needs change.

It is the sincere wish of the authors that this research and report can aid, even if just a little, in the planning, development and maintenance of a design system in government somewhere in the world.

Thank you for reading.

RESOURCES

SECTION 6
RESOURCES

DESIGN SYSTEMS AROUND THE WORLD

Organisation	Design System Name	URL
Morning Star	MDS	https://designsystem.morningstar.com
REI	Cedar	https://rei.github.io/rei-cedar-docs/
IBM	Carbon	https://www.carbondesignsystem.com/
Shopify	Polaris	https://polaris.shopify.com/
Danish Board of Digitization	The Common Design System	designsystem.dk
GDS	GOVUK Design System	https://design-system.service.gov.uk/
Google	Material Design	https://material.io/design
Target	Nicollet	Nicollet: target.com
Government of Alberta	Government of Alberta Design System	https://imtpolicy.sp.alberta.ca/guidelines/Pages/GoA-Design-System.aspx
Government of Ontario	Government of Ontario Design System	https://designsystem.ontario.ca/
National Institute for health and care excellence		https://design-system.nice.org.uk/
GitHub	Primer	https://github.com/primer
Buzzfeed	Solid	https://solid.buzzfeed.com/
Salesforce	Lightning	https://www.salesforce.com/campaign/lightning/
Societe Generale	SG Design System	_
Canonical	Vanilla	https://vanillaframework.io/
Spotify	Encore	https://spotify.design/article/reimagining-design-systems-at-spotify
VMWare	Clarity	https://clarity.design/
WeWork	Plasma	_