Organizational Challenges in Company Adoption of Design Systems
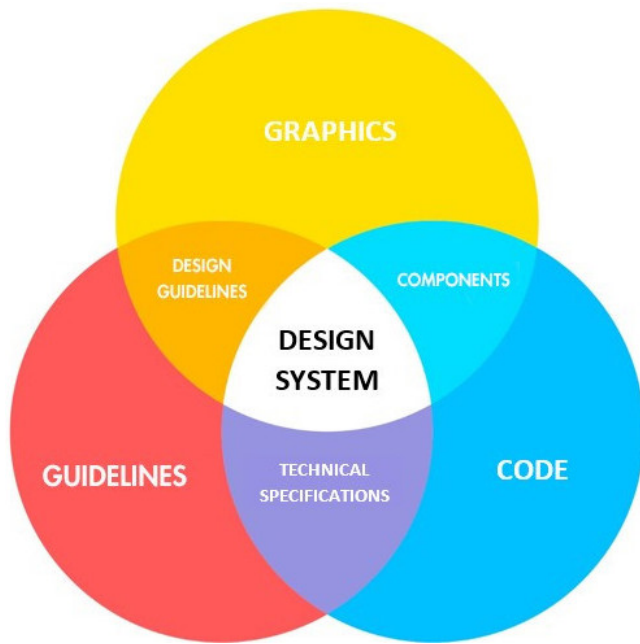
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KEYWORDS

Design System (DS), Experience Team, Stakeholder, Documentation, Component

Figure 1: Venn diagram illustrating the 3 foundational elements of a design system: Code, Graphics, and Guidelines/Documentation. This diagram highlights the interconnections between these elements. Note: 'Guidelines' is used interchangeably with 'Documentation' in the associated text [6].

1 INTRODUCTION

Large companies like Google often offer a large number of consumer products, including Gmail, YouTube, and Google Drive. Despite the diversity of these services, they share a unified user interface and experience, thanks to Google's Material Design. Such Design Systems (DSs) are centralized collections of reusable artifacts and documentation. They enable design and engineering teams to create and manage digital products with consistency and efficiency. However, despite their increasing adoption across various sectors, shifting to a DS-focused workflow introduces considerable challenges, requiring significant changes to existing practices. This paper seeks to illuminate the field of DS, which has seen scant scholarly investigation.

Through a series of case study interviews with DS designers, engineers, and managers, this project explores the difficulties encountered during the DS adoption process. Our study is driven by the central question: *What are the main organizational challenges companies face when adopting a design system?* We hypothesized that the primary challenges are securing usage from experience teams and acquiring development resources from executives. We believed that stakeholders may perceive DS as a product whose intangible impact does not justify its technical costs.

Our findings confirm our hypothesis and reveal diverse adoption strategies across companies, leading us to propose potential methods to facilitate smoother DS integration. This paper contributes to the HCI field by 1) identifying key stakeholders in the DS adoption process and detailing the complex interactions between them, 2) identifying four primary challenges companies face, and 3) suggesting actionable strategies to improve DS adoption processes.

2 BACKGROUND AND RELATED WORK

Companies strive to create consistent digital experiences for their customers, especially when managing many products. Consistency not only assures users of product quality but also strengthens brand image, which is important for company development. However, achieving consistency in user interfaces and experiences across various products managed by different teams can be challenging without a structured approach. DSs offer a solution by serving as single sources of truth. These systems ensure that despite the multiplicity of teams and products, company branding and consistent experience is ensured across different interfaces.

DSs are not rigid frameworks; they are dynamic systems tailored to meet the specific needs and values of a company, which can lead to significant variations from one DS to another. This adaptability often complicates the formal definitions of a DS, as one system could contain artifacts that are missing from another. Nonetheless, there is a general consensus within the community that a DS should encompass component libraries, style guides, design guidelines, and content guidelines [8]. For the purposes of this research, we define a DS in a similar manner: As a centralized repository containing reusable components and documentation designed to facilitate consistent branding and user experience across a company's digital products.

Recent research on DSs have been limited but typically focus on understanding community perceptions [8]. While there is some research addressing challenges related to DS utilization and proposing combating strategies [3], no previous research has considered the complex stakeholder relationships involved in the initial adoption process, which we define as the transition from a non-DS to a DS workflow. Our research aims to fill this gap by identifying

organizational challenges in DS adoption processes and proposing potential strategies that could enhance their integration into corporate structures.

3 METHODOLOGY

3.1 Participants

Recruiting through LinkedIn, we sent interview inquiries to product designers, design leads, DS consultants, DS managers, and DS-dependent software engineers from mid to large size enterprises. We successfully connected with 12 professional individuals, 7 of which agreed to be interviewed within the limited scope of our project timeline. Of these 7, 4 were men and 3 were women. All participants had intimate knowledge of the creation and/or maintenance of a corporate DS.

3.2 Study Design

Interviews ranged from 30 minutes to 1 hour and were conducted virtually. All conversations were guided by a carefully curated list of questions (detailed in the Appendices) that sought to uncover the common challenges encountered in the adoption phases of DS development. Sample questions include:

- *When did your organization recognize the need for a design system?*
- *How did you facilitate the transition for teams previously unfamiliar with design systems?*
- *What tools and platforms are/were employed to manage and disseminate your design system?*

Responses were transcribed live. All interviews were conducted prior to commencing qualitative analysis on the responses. Our analysis methodology involved synthesizing all interview responses, grouping them, and organizing them according to the respective questions posed. This structured approach allowed us to systematically examine participant perspectives on various aspects of DS adoption. We undertook qualitative coding of the responses by identifying recurring themes within each question. Our focus was on questions that elicited substantial discussion and traction, as we aimed to identify commonalities in DS adoption processes and challenges across different corporate contexts. This approach ensured our analysis remained focused on overarching themes rather than specific company practices. Following the identification and synthesis of common themes for each question, we conducted further refinement and qualitative coding to discern underlying patterns and challenges. Through iterative analysis, we sharpened our understanding of the challenges faced by corporate design teams during the DS adoption process. After multiple rounds of coding and analysis, we identified four main challenges in the adoption of DSs within companies. These challenges represent recurring issues encountered across various organizational contexts and provide valuable insights into the complexities of DS implementation and integration within corporate settings.

4 RESULTS

Figure 2 illustrates the dynamic interactions and relationships between 3 key stakeholders involved in the implementation and maintenance of a DS: Executives, DS Users (Experience Teams), and DS
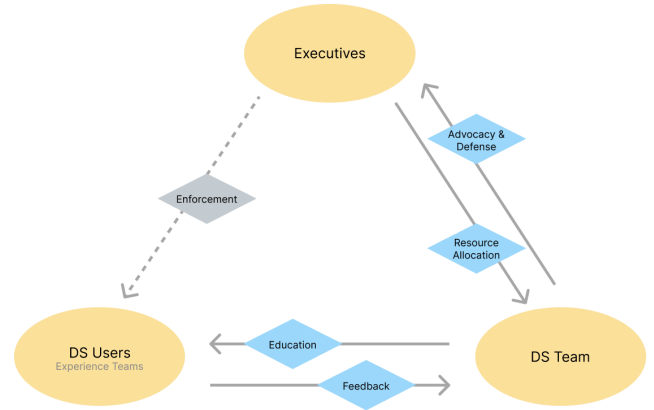
Figure 2: Relationship dynamics between main DS Stakeholders: DS Users, DS Team, and Executives.

teams. Experience teams, which typically include various departments focused on crafting and delivering customer experiences, especially in digital products, are central to this process. In the context of our study, we define experience teams as those involved in engineering, design, and product development within the broader spectrum of customer experience initiatives. These individuals provide the valuable feedback necessary for the growth and improvement of DSs, which is driven by DS teams. Conversely, the DS team educates DS users on adoption and implementation. The DS team also engages with executives, demonstrating the benefits of investing in DSs. These executives, in turn, allocate resources to the DS team to support its growth and development. Additionally, in some cases, executives mandate DS adoption among users (denoted by the dotted arrow) though this relationship was not observed universally among all companies interviewed.

4.1 Onboarding of Experience Teams

The process of onboarding experience teams onto a DS can present considerable challenges, particularly when these teams are accustomed to legacy workflows and methodologies. Effective onboarding necessitates clear communication and education about the DS, including its purpose and proper utilization. Unclear initial guidance can hinder the effective usage of the DS, as noted by P1: "Many people do not understand how to properly use the DS and some even created their own components or modified existing ones." This misunderstanding can lead to redundant work and reduce the DS's overall effectiveness.

Another observation is that the onboarding may or may not be supported by executive mandates. In certain companies, DS adoption was mandated as a top-down directive from executive leadership to individual experience teams. In such cases, teams were compelled to familiarize themselves with the DS as it was 'forced' upon them. Conversely, in organizations lacking this top-down mandate, DS teams often found themselves advocating for the system's adoption and demonstrating its value, placing an additional burden on them. Regardless of which approach was taken, there was friction between the DS team and the experience teams.

Moreover, the onboarding process adds to the workload of employees. Learning how to use the system is in itself a challenge. Employees must spend additional time on DS education while carrying out their regular tasks at the same time. This dual demand can lead to frustration among users, as the initial adoption process may appear burdensome and the long-term benefits of the DS system may not be immediately evident.

In addition, improper usage of DS components can occur, with some experience teams creating spin-off versions of the original DS to better suit their siloed needs. This further complicates the standardization efforts intended by the DS and underscores the importance of effective education and communication during the onboarding process.

4.2 Shifting Experience Teams' Attitudes toward DS

Ensuring successful adoption of a DS also involves navigating the challenge of shifting experience teams' attitudes toward the DS. DS teams must cultivate and sustain positive relationships with other product teams to garner consistent buy-in and support. However, the introduction of DS often entails significant changes to existing workflows and may result in a perceived loss of autonomy among team members. One of the primary hurdles in this process is convincing users not only to adopt the DS but also to embrace the new workflows it brings. This transition can provoke hesitation, particularly among engineering teams accustomed to code-first approaches and rigid handoff processes. Prior to the introduction of DS, team members likely operated within workflows established early in their tenure. These experience teams also had a greater degree of autonomy, allowing them to make more decisions. The introduction of a DS-based workflow, however, diminishes the authority of other experience teams. Such loss of autonomy can thus be met with resistance.

4.3 DS Development and Release

Design systems are long-term products — early structural decisions establish a foundation that supports the system's weight for years to come. We found two main problems in DS development that resulted in significant problems down the line: Rushing development and not involving experience teams in the development process.

Companies can often rush DS teams to develop and finalize their DSs, which results in significant technical debt. P1, for example, mentioned that during the initial release of their DS, experience teams were plagued by bugs. These bugs were subsequently fixed but required experience teams to install new packages multiple times, increasing unnecessary workload and friction. P3 also made the following comment when asked about good adoption methodologies: "Fast development and adoptions of DSs will not work. DSs require a lot of careful planning: at least 1 to 2 years." Thus, while companies may want to quickly roll out a design system for other experience teams to use, they must be aware that they are comprehensive systems that need to be developed thoughtfully.

Another problem can arise if experience teams are not involved in the development process early on. The resulting DS may not align with their needs. DS consumers could be frustrated with the DS and choose not to adopt it.

4.4 Executive Support and Resource Acquisition

We found that reception of DSs varied greatly between our interviewees' past and present companies, as the perceived value of DSs were beginning to gain recognition as a valuable asset industry-wide. As a result, some companies had complete buy-in from executives — with fully-funded DS design and engineering teams — while in others, DS teams were non-existent or promptly laid off after initial implementation. We also found that DS teams with more executive support coincided with higher satisfaction from DS team leads. The main benefit mentioned was more appropriate, sustained staffing. A successful DS relies on consistent iteration, which depends on an enduring well-staffed team to build out the DS over time. Garnering this executive support is an effort often taken on by DS team leads, who not only serve as contributors, but also as advocates of their DS. As DSs do not produce short-term, tangible financial returns, executives need to be persuaded by the long-term cost savings and workflow benefits that they can provide instead. Successfully persuading executives of these benefits and acquiring the necessary resources for sustainable and effective development, however, is not an easy task.

5 DISCUSSION

In response to the problems we identified above, we propose the following measures to improve DS adoption processes:

(1) Improve cross-team communication channels and support tools.
(2) Ensure slow and steady DS releases.

5.1 Improve cross-team communication channels and support tools

Communication is at the heart of DS adoption; for experience teams to best understand how to use the DS, there must be constant communication between them and the DS team. There is a general consensus among our interviewees that multiple communication channels are necessary, whether it be through actively reaching out to other experience teams by sending weekly newsletters about DS updates or opening Slack channels for Q&A. No matter how thorough the documentation, there must be other methods for experience teams to interface with the DS. By providing additional communication channels, users can ask DS-related questions to improve their understanding and offer feedback.

In addition to providing Q&A support, communication channels can facilitate constant collaboration between DS teams and DS users. This is vital in making a system that remains relevant to its users. It was found that collaborating with consumers instead of developing in isolation fostered a generally more positive attitude toward the company's DS. P3 emphasized this point: "Other teams need to understand that the DS was designed to support them. We want them to tell us what they want." Experience teams should understand that the introduction of a DS is not intended to strip them of their autonomy. Rather, it should support their workflow.

It is important to note, however, that not all types of communication channels are equally effective for every scenario. In addition to documentation, newsletters, and open slack channels, P6's company hosts weekly office hours for DS support. The service, however, appears to be underutilized: "The people who need to come to office

hours are not coming. Help is not reaching those who need it the most, especially the engineers." It is thus important for companies to identify the most effective communication channels to facilitate conversation with the current reception of their DS in mind, whether it be introducing additional tools (e.g., Jira) or developing new ones, experimenting with different methods and seeing which works best for them. P2, who is also a DS researcher, has expressed interest in exploring new DS support tools and potentially even introducing chatbots or AI. Adding immediate Q&A support and enhanced interactivity thus seem to be paramount in improving DS support systems for their company.

5.2 Ensure slow and steady DS releases

As identified earlier, rapid development and widespread adoption can lead to significant technical debt and a more expensive onboarding process. Rather than deploying DS solutions across the entire company, DS teams may benefit from adopting a more gradual and measured approach to releases. This ensures that systems are thoroughly tested and integrated without disrupting the existing workflows of experience teams. An effective method to achieve this is through pilot programs. For example, P3's team is currently conducting a pilot scheme where they perform sentiment analysis with a select few experience teams using the DS in its prototype form. This allows DS teams not only to refine their systems based on real feedback but also helps experienced teams feel more invested in the DS development process.

6 CONCLUSION

Our research aimed to better understand the challenges companies face when adopting a Design System (DS). Through conducting 7 case study interviews, we identified key stakeholders in the DS adoption process and uncovered the complex relationships between them — an area previously underexplored within the HCI community. We identified four major challenges: 1) Onboarding of Experience Teams, 2) Shifting Experience Teams' Attitudes towards DS, 3) DS Development and Release, and 4) Executive Support and Resource Acquisition. These findings not only contribute to our understanding of DS adoption but also reveal insights into DS utilization methodologies, suggesting practical approaches to enhance adoption processes. By highlighting these challenges and opportunities, our research invites further exploration and application, aiming to inspire more efficient and effective integration of DS in organizational workflows.

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A   INTERVIEW AGENDA

Interview Agenda

Thank you for participating in our research. Our study is focused on understanding the processes, challenges, and outcomes associated with adopting and implementing Design Systems within organizations.

In our research, we aim to uncover the nuanced experiences of different organizations as they navigate the complexities of implementing and adopting a design system. By gathering insights from your experiences, we hope to identify common hurdles, effective strategies, and potential areas for improvement in the adoption process. To this end, we have prepared a series of questions we plan to ask, presented here for your pre-reading:

General:
1. Could you introduce and describe your design system and its primary objectives?
2. When did your organization recognize the need for a design system?

Onboarding and Utilization:
3. How did you facilitate the transition for teams previously unfamiliar with design systems?
4. Are there ongoing difficulties in utilizing the design system?
5. How widespread is the implementation of your design system (i.e., adoption rates) across teams and brands within the organization?
6. What impact has the adoption of the design system had on workflow and productivity within your teams?
7. What tools and platforms are employed to manage and disseminate your design system?

Continued Development:
8. Reflecting on your experiences in adopting the design system, what would you have done differently?
9. What are the current initiatives or future plans to evolve the design system?
10. Do you think your design system has been successful?