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The transformation of design platform under system thinking

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ABSTRACT

This study examines the organizational transformation of digital design platforms (DDPs) to present the considerations of DDPs' value propositions, service offering, and sustainable business models. When we face large, complex, systemic transformational challenges, especially during the pandemic, we must make meaningful changes to a DDP to rise to these social-technological challenges internally and externally to generate positive social impacts and create value for design individuals and communities. Due to COVID-19, people's daily lives, interactions, and work experiences, and communication patterns dramatically changed, which significantly influenced organizations across scales and industries. DDPs have also been hit by the social-technological impact of COVID-19. We conducted seven semi-structured expert interviews and demonstrated ten case studies across three categories: design competitions, design professional associations, and design companies about DDP transformation associated with COVID-19 through the lens of system engineering. The goal is to analyze organizational change and its impacts on a DDP's service offering, business model, and organizational culture, in an effort to better prepare new capabilities in the era of social-technological transformation. We identified four key takeaways: (1) craft new partnership connections; (2) identify criteria for transformation; (3) create and extend participants' engagement level, and (4) leverage collective talents and sources.

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KEYWORDS

Design platform; organization design; system thinking; system engineering; OPM; Object-process methodology

1. Introduction

When the COVID-19 pandemic hit in 2019, it was unknown how long it would last and how much it would influence people's daily lives, the way we work, and our interactions with others, or how it would disrupt industries in terms of business models, market positions, service models, and much more (Amatullo et al. 2022). Many large international organizations, corporations, and enterprises, and small firms like medium-size companies

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and personal studios, including many types of design platforms have already faced these complicated challenges to survive and evolve by reconstructing their service offerings, marketing positions, business models, company culture, and have thought about new communication and interaction approaches within organizations in response to changes influenced by the COVID-19 (Wizinsky 2022).

The motivation for conducting this experimental research and to explore the complicated systemic challenges comes from our having observed the above phenomena and experienced the organizational transformation process during the COVID pandemic. We are especially interested in discussing the learnings, reflections, and ideas around digital design platforms. Therefore, in this study, we constructively explore the organizational transformation phenomenon caused by COVID-19 in design and creative industries across three categories by using two system modeling techniques and system thinking (Jones and Van Ael 2022): (A) design competitions (e.g. International Design Award, iF Design Award, Core77 Design Award, and Global Grad Show), (B) professional design associations (e.g. Industrial Designers Society of America, Design for America, and World Design Organization), and (C) design companies (e.g. OpenIDEO, Fast Company, and Whipsaw).

For the purpose of communication and consistency, we propose the term digital design platform (DDP) in the paper to cover the above three different types of platforms with different design service offerings. We view DDPs as a collection of organization archetypes with different services and marketing positions to deliver the values to participants and service providers. There are ten selected DDPs in this study as case studies for us to analyze their organizational transformation process, upgraded marketing positioning, new business models, and people's behavioral change. Thus we clustered the ten DDPs examples into three categories: (A) design competition, (B) design professional association, and (C) design company for further discussion.

1.1. The context of digital design platform (DDP) transformation

An experimental research study was conducted between 2019 and 2020, in the early stage of the pandemic. There was little information or research literature to discuss the impact of DDP and how to evolve its organizational structures, culture, service offering, market position, and business models. In the era of transformation and the pandemic, most DDPs face substantial external and internal pressure to change in terms of people, product, process, and platform (Lee 2020). Users, including people who submit their design works or companies' works or engage with the three types of DDPs, started to think about other benefits for users other than winning design awards for most DDPs. Why does it matter to them or companies in terms of their personal growth, community building, and community culture cultivation? How can they leverage the resources of DDPs to elevate their personal goals or companies' vision and mission through collaborating with DDPs (Brown and Katz 2019)?

Therefore, in this study, we used ten DDPs under three categories to demonstrate the conceptual application. Thus, in Category A: design competition, we observed four examples: International Design Award (IDA), iF Design Award, Core77 Design Award, and Global Grad Show (GGS) to demonstrate why and how each DDP needs to undergo the organizational transformational process. In Category B: design professional

associations, we captured three case studies: Industrial Designers Society of America (IDSA), Design for America (DFA), and World Design Organization (WDO) to reflect the emerging needs of designers, design professionals, and design academics under the pandemic situation. Regarding Category C: design company, we demonstrated three iconic examples: openIDEO, Fast Company, and Whipsaw from the industry to reveal the adaptability, flexibility, and modularity of an organization in terms of structure, culture, and process.

1.2. Research questions and key term overview

The latest organizational transformation process and new phenomena influenced by the pandemic made us curious about exploring the root cause and the process through two system modeling approaches and system thinking (Jones and Van Ael 2022) to understand how these ten selected DDPs reframed and reacted to the challenges in emergent, complicated, systemic, and also difficult situations. Therefore, in the study, we explored and experimented with the following research question: How might we envision the service design and business models of DDP through the lens of expert interviews and system thinking: ARIES, Architecting Innovative Enterprise Strategy, framework (Nightingale and Rhodes 2015) and OPM, Object-Process Methodology (Dori 2002), to adapt to the needs of users (e.g. designers, design students, and design educators) that provide value from design award recognition to educational purposes, community building, and creative culture cultivation during the pandemic?

According to our research question, we put an emphasis on service innovation, including service strategy, platform design, educational value, and upgraded business models. To clarify, we defined the three terms: DDP, user, and context, as shown in Table 1. Besides organizing our learnings and concluding our research insight, we used the ARIES framework to help us understand the context from seven semi-structured expert interviews and analyzed ten DDPs as immersive case studies to demonstrate the evidence of the evolution and transformation process of organizational change, including business model, digital content, the language/term they use with customers, e.g. designers, design studios, enterprise, and other relevant design service offerings.

2. Literature review

In this section, we cover two topics. The first is about transformational change within DDP (Blum 2021). We define and analyze the ten selected DDP as three different types of organization archetypes with different services and marketing positions: (A) design

Table 1. The definition of three key terms: DDP, user, and context.

	What	Who	When
Term	Digital Design Platform (DDP)	User	Context
Explanation	In the research, we specifically focused on DDP with the three different service offerings: (A) design competition, (B) design professional association, and (C) design company.	We used the term users in the study to indicate designers, design students, and design educators. In general, people want to receive award recognition through DDPs.	Since we made the analysis in 2020 at the early stage of the pandemic, most research was conducted through virtual communication channels.

competition; (B) design professional association, and (C) design company. We researched the literature about the organizational change relevant to DDP. In the second part, we explore two major system analysis tools: ARIES framework and OPM from the concepts, and theories, to applications. The intention is to help us more precisely study the research topics by identifying the evidence.

2.1. System thinking

Before discussing the definition of system thinking, we explored the concept of a system. Crawley, Cameron, and Selva broadly describe a system as a set of entities and their relationships, whose functionality is greater than the sum of the individual entities (Crawley, Cameron, and Selva 2016). Similarly, a system can be expressed as a set of elements collectively connected performing a specific function that cannot be created by the element alone (Rechtin 1991). So what is system thinking? System thinking can be described as a part of system engineering. Haberfellner, de Weck, Fricke, and Vossner proposed that system thinking should cover three parts: (1) terms to describe complex entities and their relations; (2) model-based approaches to illustrate real complex phenomena without having to simplify them unduly, and (3) approaches that support holistic thinking. System thinking can be understood as an approach to help us better learn, solve, and design complex phenomena/systems (Haberfellner et al. 2019).

System thinking does not mean thinking systemically; instead it means to view things as systems, as mentioned by Edward Crawley, Professor of Aeronautics and Astronautics and of Engineering Systems at Massachusetts Institute of Technology (MIT). One of the benefits of system thinking is how it helps us to decompose these complex systems and make them appear less complicated (Crawley, Cameron, and Selva 2016). The critical part of making a system appear less complex lies in using system architecting language, e.g. OPM, to model complicated systems. Therefore, in this study, we used OPM, a conceptual modeling-based language to study systems of DDPs, and paired it with ARIES framework as the key analysis approach to discuss the pros and cons of ten DDP models. Leveraging the concept of system thinking and system architecting language, e.g. OPM, laid a critical and constructive foundation for this research to systematically help us decompose DDP systems by applying ARIES enterprise element model to distill the research insights regarding DDP's business strategies, service models, and scalable process and plan.

2.2. ARIES framework

Nightingale and Rhodes introduced an ARIES framework to analyze and architect enterprises' transformation process (Figure 1). Their intention is to create a comprehensive vision for the future enterprise including organizations, corporations, and small companies; show how effective and efficient ARIES framework can be; and create more relevant system-level concepts, alternative system architectures and roadmaps, criteria for evaluating possible system architecture, and practical implementation and planning tools (Nightingale and Rhodes 2015). ARIES framework can be applied in various domains from product design and development to medical design, organizational change, social impact projects, service innovation, and even experience design. Some researchers have applied ARIES framework to analyze the organizational transformational change

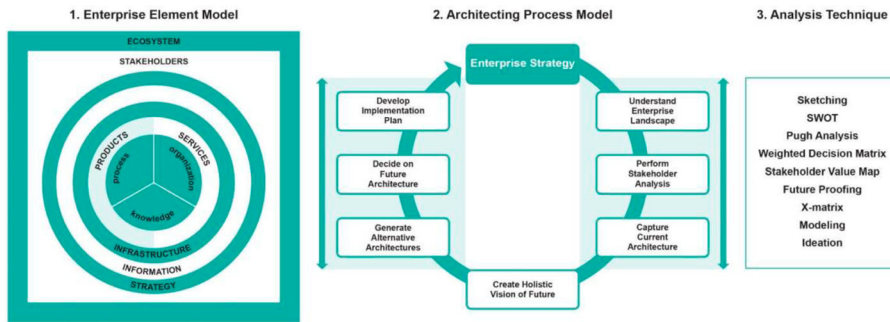


Figure 1. ARIES framework (Nightingale and Rhodes 2015).

in the design consultant industry (Lee et al. 2021). Other researchers discussed disruption from digital transformation through ARIES framework (Lucioli 2022).

In this study, we used the ARIES enterprise element model consisting of ten elements to give us a bird's-eye view on DDP from various perspectives. We viewed the ten elements as ten lenses for studying DDP, including understanding DDP's ecosystem, key stakeholders, and strategies, along with business models, the information required from an organization, and how the infrastructure can enable systems, technologies, and communications to influence the organization performance; finally we identify the upgraded definition of products, services, and process through the lens of organization. Each element is interconnected and as a whole guides organization architects, researchers, or designers to consider the elements holistically. By curating and combining the ten elements accurately, we can take a closer look at the whole picture of DDP. The overview and brief explanation of the ten elements are shown in Table 2.

2.3. Object-process methodology (OPM)

The study applied OPM, a module-based system modeling language with simple graphics and natural language sentences, to analyze the ten DDPs, expressing each system's

Table 2. ARIES enterprise element model (Nightingale and Rhodes 2015).

Element	Description
Ecosystem	The external regulatory, political, economic, market, and societal environment in which the enterprise operates and competes/cooperates with other enterprises
Stakeholders	Individuals and groups who contribute to, benefit from, and/or are affected by the enterprise
Strategy	The strategic vision along with associated business model and key strategic thrusts, goals, and performance management system
Information	Information the enterprise requires to perform its mission and operate effectively in accordance with its strategy
Infrastructure	Enterprise-enabling systems and information technology, communication technology, and physical facilities that enable enterprise performance
Product	Products the enterprise acquires, markets, develops, manufactures, and/or distributes to stakeholders
Services	Offerings derived from enterprise knowledge, expertise, and competencies that deliver value to stakeholders, including support of products
Process	Key leadership, lifecycle, and enabling process by which the enterprise carries out its mission and creates value for its stakeholders
Organization	Culture, organizational structure, and underlying social network of the enterprise
Knowledge	Competencies, expertise, explicit and tacit knowledge, and intellectual property resident in and generated by the enterprise

functions, structures, and behavior (Dori 2002). OPM is a useful expression tool with visuals and language to help us intuitively and clearly understand each DDP's organizational structure and system in a single integrated model to create unbiased criteria to conduct the research.

The concept of OPM is to assume that everything in the world can be modeled either as objects or processes, or a combination of both (De Weck 2022). Thus in the study, we defined a DDP as an informational object consisting of other objects either physical or informational. Meanwhile, the service offerings provided by DDP can be viewed as a type of process to 'transform' or 'consume' the status of many various objects within a DDP. In addition, OPM contains three types of links to form connections: (1) structural links: links between objects; (2) procedural links: links between objects and processes, and (3) invocation links: links between processes.

OPM is a useful analytical system-modeling tool developed by Professor Dov Dori at Technion. Knowing how to use OPM properly can help us at an organizational level to break down all the elements as objects or processes. Every DDP is a complicated system considering people they hired, methodologies they applied, platforms they used, connections they trusted and established, business models they created, and other elements in a system and other sub-systems to maintain a functional DDP. We assume COVID-19 as an external process that is impacting the current DDP, which is a great opportunity to apply OPM to help us reconfigure how to optimize and reconstruct the resources to position DDP on the market.

There are various applications of using OPM combined with the design thinking process. For example, some researchers have applied OPM to redesign and analyze the campus tour experience (Lee et al. 2020), build future space travel estimation with reliable business models, adjust the early-stage of product design and development (Lee, de Weck, and Coughlin 2021), and create smart footwear designs for an aging population (Lee 2021a, 2021b). Although OPM, a system modeling language, is still in its early stage of design and development, its powerful models and universal framework can adapt to various system-level challenges, and is especially valuable at capturing the system's exogenous influence, intensifying internal functions or clarifying subsystems design variables (De Weck, Roos, and Magee 2012).

3. Research methods

The research structure can be divided into three parts: (1) input, (2) analysis, and (3) output (Figure 2) to help us explore and solve our research question: how to envision the service design and business models of DDP through the lens of expert interviews and system thinking (ARIES framework and OPM) to adapt to the needs of users (e.g. designers, design students, and design educators) that provide value from design award recognition to educational purposes, community building, and creative culture cultivation in the era of the pandemic. In this study, we used seven semi-structured expert interviews combined with the information gathered from the selected ten DDPs' websites/digital touchpoints across three categories: design competition, design professional association, and design company to pair the results with literature reviews to generate insights in response to our research question.



Figure 2. Research flow and process.

Especially, we were curious about the transformational organizational change of DDPs influenced by the pandemic. Therefore, we gather the information and data through literature reviews, expert interviews, and ten DDP case studies. And then we analyzed ten DDPs by using ARIES enterprise element model and OPM to enable us to find meaningful research insights to achieve the four key learning points: (1) craft new partnership connections; (2) identify criteria for transformation; (3) create and extend participants' engagement level, and (4) leverage collective talents and resources to summarize the study and suggest the further research topics. The overall research flow and methodologies are demonstrated in [Figure 2](#).

3.1. Conduct semi-structured expert interviews

To comprehensively understand the experts' perspectives on DDP, we consulted with seven experts from academia and industry and conducted one-hour semi-structured interviews on average. The interviewees' background information is shown in [Table 2](#). Even though the recruiting is done through authors' personal connections, we chose a team of experts from diverse backgrounds to ensure we capture the bird's-eye view. Thus, our recruitment criteria included the expert interviewee's industry position, experience in design, gender, and location (culture).

We followed a one-hour designed discussion guide, starting by discussing their educational background, industry experience, and design expertise, and then probing more around their personal experiences with DDP, especially their opinions about the transformational change of DDP during the pandemic in terms of its service innovation, business models, and organizational cultures. How did they envision the future of DDP? How did they align the value proposition of DDP with users' unmet needs, catering to the market change in the pandemic? How did they define a sustainable DDP service model through the lens of system thinking and design? How did they build a resilient business to provide meaningful and valuable service for DDP users? We

Table 3. Brief definition of OPM key terms: object, process, and state.

	Object	Process	State
Modified Explanation (De Weck 2022)	Objects are things that can exist unconditionally and there are two types of objects: physical one (e.g. organisms, people) and informational one (e.g. ideas, concepts).	Processes are a shift of object status changes through consuming, modifying, or transforming them. Processes can only exist under conditions and require objects to act on.	State is a part of the characteristic of an object to reveal the effectiveness and outcome caused by the process. For example, the new value proposition of DDP (process) has turned its business (object) from breaking even to being profitable (status).
Representative Icon and Example (Crawley, Cameron, and Selva 2016)			

recorded seven virtual interviews with the experts’ permission internally. We took detailed notes on the side to capture the provocative quotes, critical learnings, and inspiring ideas without revealing their identities. Partial expert interview results are shown in Table 3.

3.2. Research on DDP website and gather its information of digital touchpoints

We focused on ten selected DDPs across three categories: design competition, design professional association, and design company, as shown in Table 4. Under each category, we have selected three to four representative examples to demonstrate how these DDPs transformed their service offering to cater to the emerging needs of users during the pandemic.

For each DDP’s website and digital touchpoints, we analyzed its content, information, user experience, and then synthesized data and translated these learnings into research insights, and combined them with the results from semi-structured expert interviews in response to the original research question: How might we reimagine the service of DDP through the lens of system thinking to adapt to the needs of users (designers, design students, and design educators) that provide value from design award recognition to education purpose, community building, and creative culture cultivation in the era of the pandemic?

3.3. Analyze and discuss the result by ARIES framework

After collecting data from the literature, seven expert interviews, and ten case studies under three different types of DDP, we applied the ARIES framework to summarize our observations and learnings to envision the future DDP in terms of its service offerings

Table 4. Expert interviewee backgrounds and information.

#	Expert's Background and Introduction	Occupation	Design Experience	Location
1	He has taught in the department of design at the university for 40 years and served on a jury for multiple international design awards.	Professor in department of design at an university	40 years	China
2	She manages a group of people for an international design competition brand with the main responsibility to plan the brand's marketing strategy and business development.	Vice President of an international design competition company	10 years	Germany
3	As a second-year undergraduate student, he majors in industrial design and has a keen interest in learning product design and manufacturing processes.	Undergraduate student majoring in industrial design	3 years	USA
4	She has worked in the field of design research and strategy for 20 years with rich user experience and interaction knowledge.	Leadership role in a medium-sized design company	30 years	Taiwan
5	After graduating from a prestigious design school in France, he joined an international design consultant as a communication designer for 5 years.	Young design talent majoring in graphic design and recent graduate from university	5 years	UK
6	She enjoys the freedom to work with the clients she likes. As the founder of the company, she wants to extend its scale by having more projects and investments.	Founder of a 10-employee design startup	15 years	Tokyo
7	He is in his senior year of college with a huge interest in design, without majoring in it. He would love to explore design knowledge and learn design skills to prepare for his work application.	Senior year of college student who is interested in design in general	1 year	Singapore

and operations, business models, creative culture and communities building, and also suggest the future studies of research.

4. Results

In this section, we documented the learnings from seven expert interviews in terms of provocative quotes, unique perspectives, and inspiring ideas combined with our first-hand digital observations and experience of the selected ten DDPs' websites and their relevant online materials, and literature reviews (Table 5). The research results and evidence helped us consider our initial research question and the approach to evaluating early hypotheses.

4.1. Learnings from expert interviews

The following three key learnings were summarized from our ten semi-structured expert interviews (Table 2). Each interview was about an hour long on average. We covered experts' perspectives and concerns about the current DDP's position, service offerings, business model, organization structures, and future challenges. We started from understanding the needs and motivation of the DDP's users (Section 4.1.1.), analyzed the evolution of DDP from an organizational aspect inspired by the concept of the product lifecycle (Section 4.1.2), and finally discussed and envisioned the future of DDP by identifying its design implications and business opportunities (Section 4.1.3).

Table 5. The list of selected ten DDPs for research and analysis.

#	DDP's Name	Category
DDP1	International Design Award (IDA)	Category A – Design competition
DDP2	iF Design Award	Category A – Design Competition
DDP3	Core77 Design Award / Student Showcase	Category A – Design competition
DDP4	Global Grad Show (GGS)	Category A – Design competition
DDP5	Industrial Designers Society of America (IDSA)	Category B – Design professional association
DDP6	Design for America (DFA)	Category B – Design professional association
DDP7	World Design Organization (WDO)	Category B – Design professional association
DDP8	OpenIDEO	Category C – Design company
DDP9	Fast Company	Category C – Design company
DDP10	Whipsaw	Category C – Design company

4.1.1. Consider users' essential needs and motivation through the lens of DDP design

Expert 1 asked, 'What makes people want to keep applying for design awards (DDPs)? Is it to gain the designer's personal brand exposure? Is it to help client succeed in terms of business and impact? Is it to promote good design by using the frame of design awards?' These questions were also mentioned by other experts during the interviews. Understanding users' motivation to have design awards fundamentally can help most DDPs reposition themselves. The environment has dramatically changed the typical users' needs, because of the pandemic. People have started to work from home. Physical contact and interaction with other people has decreased. Limitations on travel have increased. And other factors have transformed the way we view DDP. Especially during the pandemic, the majority of design events, e.g. design award ceremonies, have changed to the online format. How do we reconsider the position of DDP to adapt to the new challenges influenced by COVID-19 while thinking of users' needs?

Some experts also talked about extending the service offering of DDP by providing more value to users, e.g. virtual mentorship, design education opportunities, and online internships. How might we create a foreseeable future with benefits to users that they can relate to? Expert 2 mentioned that instead of forcefully selling people (award participants) tickets, she and her team proposed to emphasize and redesign the feedback of participants' works from reviews. Essentially, she wants each award participant to receive not only design awards, but also a comprehensive evaluation and suggestions from jury teams. This initiative can motivate more young designers to join the DDP and get invaluable learning experiences from the juries of DDP.

4.1.2. View evolution of DDP as an organizational transformation and product lifestyle

Expert 4 said, 'DDP itself can be viewed as a project that also needs to evolve and be upgraded'. This enabled us to think of the typical 'product' lifecycle of DDP and what the needs, requirements, and obstacles are at each stage. Experts also thought that DDP is one type of organization famous for promoting designers and their design works. Because of COVID-19, most companies are going through a series of transformational changes to their organizational structure, leadership team, culture, business models, and much more. For example, Core77 Design Award has launched a student showcase, a virtual design mentorship program, which not only provides suggestions for students' graduation projects, but also connects them with the right industry

resources, e.g. working with and being mentored by design practitioners and finding internship opportunities. DDP's transformational change has not only disrupted its current organizational structure, but also made the leadership team of DDP re-evaluate whether its core value is tied to the needs of people, e.g. designers, or companies that submit their works, other than design award recognition that DDP generates. The one common challenge that all experts discuss in interviews is how to create a suitable condition that allows the DDP service offering to meet people's needs and desires and create a new transformational synergy inspired by the pandemic.

4.1.3. Envision the future of DDP by identifying its design implications and business opportunities

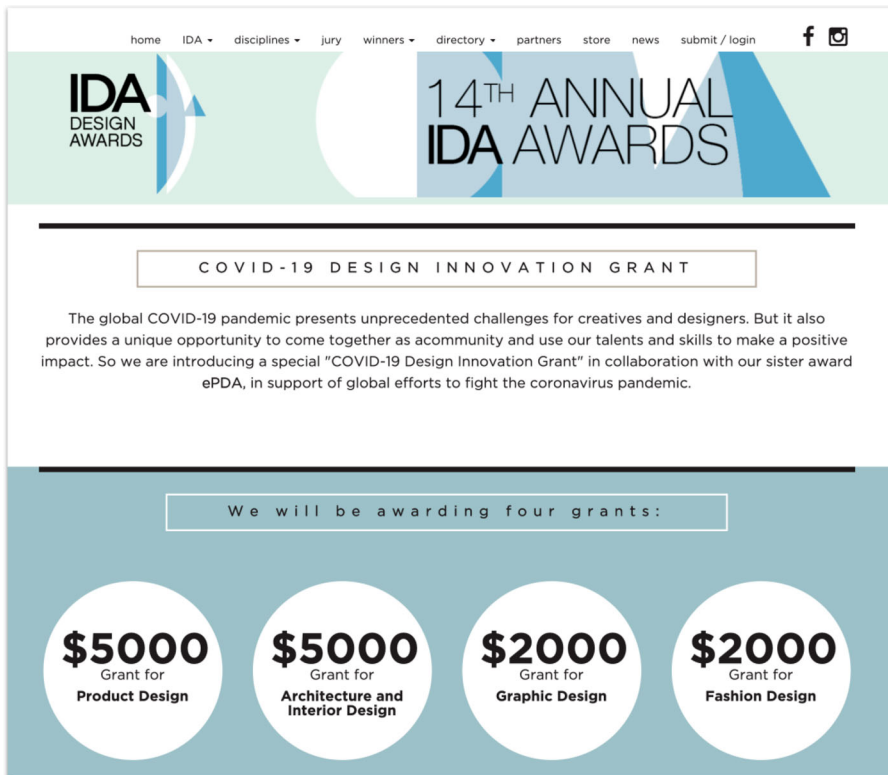
When we synthesized the ten semi-structured expert interviews, each expert talked about their vision of future DDP. Expert 6, the founder of a 10-person design startup, mentioned five key terms: adaptive model, education value, creative energy, community building, and personal growth to describe her thoughts about DDP. She said DDP's organizational structure and culture need to be adaptive, which means it should keep evolving and remain in the work-in-progress mode to deal with the challenges posed by the pandemic. By providing educational value, merging design and creativity with learning, a future DDP service model can gain a competitive edge for its market position. The concept of learning design and creativity is tied to the next key term she talked about: creative energy. Creative energy can not only empower people who subscribe to DDP's service, but also inspire employees. This also leads to the fourth and fifth key terms: community building and personal growth, which interconnect and explain why the future DDP needs to consider its service model by providing educational value and creative energy.

4.2. Outcome of DDP's analysis

From our literature review, expert interviews, digital information gathering, observation, and research, the following ten examples demonstrated each DDP's purpose and action reflecting the influence of the pandemic and the change in users' needs for DDP. We analyzed each DDP through the following three criteria: (1) keywords: we summarized each DDP's purpose and action in three to five keywords; (2) goal: we discussed the root cause and the outcome that made DDP transform its organizational structures and culture by providing new service offerings or adapting new business models in the era of pandemics, and (3) action: we highlighted each DDP's execution plans for catering to the pandemic.

4.2.1. Category A – design competition

In Category A, we studied four representative international design award brands/services to analyze each DDP's purpose, goal, and actionable plan, including International Design Award (IDA), iF Design Award, Core77 Design Award, and Global Grad Show (GGS). Only GGS is open to students in terms of award registration, not to the public or design practitioners. Even though each DDP shares some similarities in terms of their services, marketing positioning, and business strategies, each has different approaches facing the pandemic to sustain its business.



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IDA
DESIGN
AWARDS

14TH ANNUAL
IDA AWARDS

COVID-19 DESIGN INNOVATION GRANT

The global COVID-19 pandemic presents unprecedented challenges for creatives and designers. But it also provides a unique opportunity to come together as a community and use our talents and skills to make a positive impact. So we are introducing a special "COVID-19 Design Innovation Grant" in collaboration with our sister award ePDA, in support of global efforts to fight the coronavirus pandemic.

We will be awarding four grants:

\$5000 Grant for Product Design	\$5000 Grant for Architecture and Interior Design	\$2000 Grant for Graphic Design	\$2000 Grant for Fashion Design
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Figure 3. IDA highlighted the importance of design and designers' roles in solving the large complex and systemic challenges caused by the pandemic (source: IDA).

DDP 1 – International Design Award (IDA). The keywords of DDP 1 are about financial incentive, themed design challenges, and collective effort (Figure 3). The goal of DDP 1 is to apply financial incentives to attract the attention of the public and creative solutions. Since the pandemic has presented unprecedented challenges for designers around the globe, IDA wanted to encourage designers, creative talents, and students to solve the challenge by providing COVID-19 Design Innovation Grant (IDSA 2020b) for the following four design categories: (1) product design; (2) architecture and interior design; (3) graphic design, and (4) fashion design (International Design Awards 2022).

DDP 2 – iF Design Award. The keywords of DDP 2 are about financial incentive, customized reviewers report, and new judging criteria (Figure 4). The goal of DDP 2 is to extend its service offerings and business modes to bring more value to competition participants. For example, iF Design Award reduced the registration fee by 50% to attract more design students, design practitioners, or companies to join the iF design competition (iF Design Award 2022). iF Design Award not only provides new judging criteria by emphasizing more social impact to re-evaluate the quality of design works, but also gives participants a full evaluation report on their works including judges' constructive feedback and further studies for improvement.

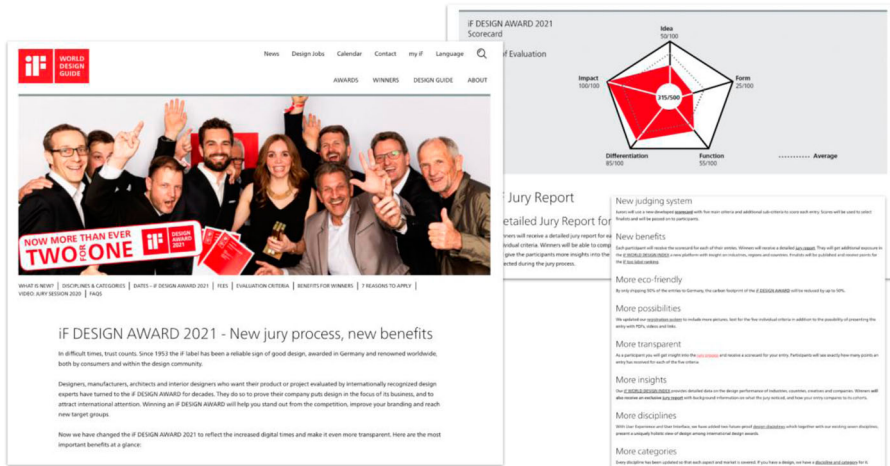


Figure 4. iF Design Award changed its business model and provided customized feedback on participants' works by integrating reviewers' suggestions (source: iF Design Award).

DDP 3 – Core77 Design Award / Student Showcase. The keywords of DDP 3 are about education platform, mentorship, and interactive online exhibition (Figure 5). The goal of DDP 3 is to create an educational service offering to help students make connections between school and industries. For example, Core77 is famous for digital design publishing. Due to COVID-19, they need to change and rethink their business offering. The first step is providing educational services by creating a guide to a design exhibition by the class of 2020 to help senior students have more online exposure for their design works and make connections with invited guest reviewers across the globe asking for their suggestions. The online celebration was from May 18 to June 30 in 2020 (Core77 2020).

DDP 4 – Global Grad Show (GGS). The keywords of DDP 4 are about concept incubation, accelerator, collectively effort, and themed design challenges (Figure 6). The goal of DDP 4

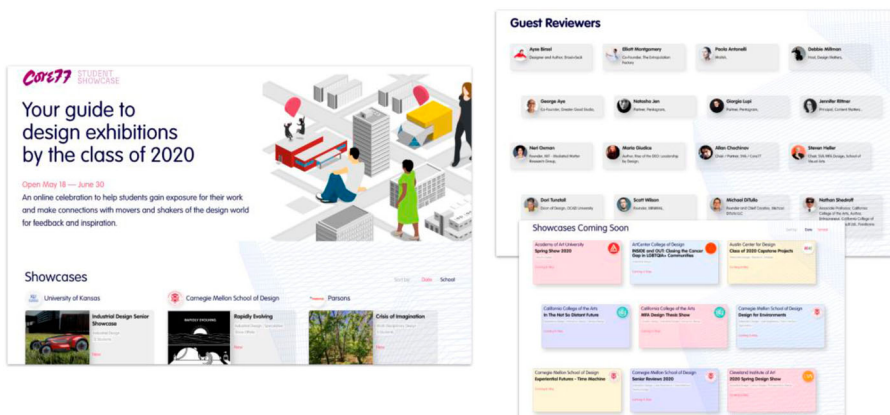


Figure 5. Core 77 Design Award extended its service offering by establishing a student showcasing platform with mentorship from industry experts (source: Core77 Design Award).

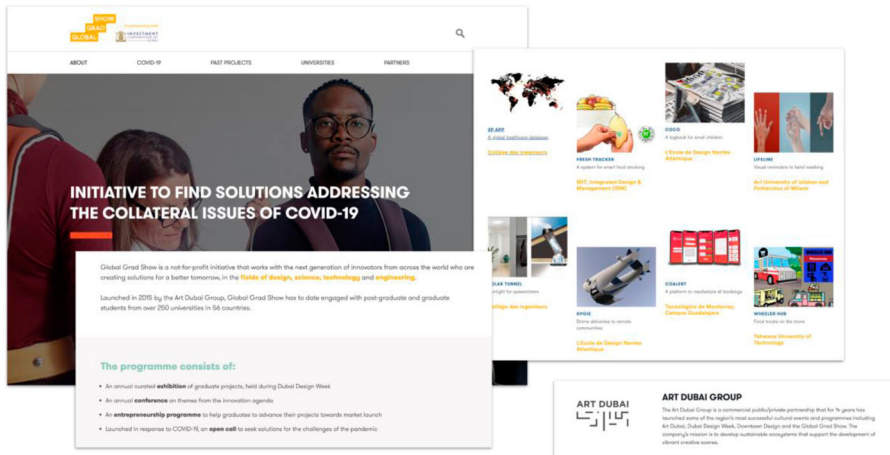


Figure 6. GGS modified their yearly themed design challenge by focusing on COVID-19-related topics (source: GGS).

is to initiate COVID-19 theme of design challenges to address the collateral issues of COVID-19 by providing further financial support, mentorship, knowledge, and physical space. For example, GGS changed their theme of design challenges focusing on COVID-related topics and initiated innovation incubators to help the winning works receive not just the award, but also financial support, mentorship building, industry connections, and physical space for startups (GGG 2020).

4.2.2. Category B – design professional association

In Category B, we studied three international design professional associations to analyze each DDP's purpose, goal, and actionable plan, including Industrial Designers Society of America (IDSA), Design for America (DFA), and World Design Organization (WDO). Each DDP well represents the perspectives from different design domains of communities: industrial design (IDSA), community-based design (DFA), and integrated design (WDO). IDSA originally created the association targeted at industrial designers or product designers. And now IDSA has broadened the definition of industrial design to become more inclusive and diverse in general. DFA put an emphasis on the US market in terms of design communities, whereas WDO, founded in 1957 and formerly known as the International Council of Societies of Industrial Design (ICSID), is always working on establishing a global design network to connect other design associations or organizations at the country level.

DDP 5 – Industrial Designers Society of America (IDSA). The keywords of DDP 5 are about gather resource, accessible information, and design communities (Figure 7). The goal of DDP 5 is to gather all critical information in one digital touchpoint, e.g. one-page website to make the information more accessible, convenient, and clear for the communities. For example, IDSA created a one-page website: IDSA Updates & Response to COVID-19 (IDSA 2021) to inform design communities about how to cope with the pandemic and also provided the latest design events, news, and information (IDSA 2020a).

IDSA INDUSTRIAL DESIGNERS SOCIETY OF AMERICA

IDSA Updates & Response to COVID-19
ALL PROGRAMMING CHANGES AND INFO CAN BE FOUND HERE.

Women in Design Deep Dive
After careful consideration, and in accordance with health guidelines from the CDC and local officials, we have decided to reschedule the Women in Design Deep Dive in Columbus, OH to **October 6, 2020**.

Sustainability Deep Dive
This is now a virtual event, occurring **June 3-8, 2020**. Registration is open, and we're offering a significantly reduced, "choose your rate" pricing option.

International Design Conference
This year's International Design Conference, Sept. 14-16, 2020 in Seattle, is currently scheduled to go on as planned. Visit the **IDC website** for more information and review our **re-scheduling policies**.

Updates at IDSA HQ
IDSA Staff are working remotely until **June 15, 2020**. Since our employees will be out of the office during this time, there may be a slight delay in the processing of mailed payments, single RENOVATION orders and the like. We also will be waiving all wire fees at this time, until further notice. All major operational functions and support of the IDSA community will continue, including phone calls, emails and other forms of digital communication related to our events, chapter activities and programming.

Design Challenges & Initiatives to Address COVID-19

- **Luxembury Lab: Open Source Initiatives to Address COVID-19**
- **Design Can Help: Code Life: Women's Challenge 2 (Cafe)**
- **MakerCon21 (Canceled)**
- **Global Good Design** has issued an open call in search of solutions related to COVID-19 and its various medical, social and economic effects. This initiative is open to students, graduates and educators.
- **Petusa NYC** has launched a **website** with resources on how to build simple intubation shields. They're also working on face shields - more info [here](#).

Additional Resources

- Designers for Hire: Y Combinator is putting together a list of designers looking for work. Fill out their form [here](#).
- **Address** is offering free temporary Creative Cloud licenses. [Learn more](#).
- **Repspace** is offering free temporary laptop licenses. Search for **affiliation of yourRepspace.com**.
- **Worship** has organized their free show option to 500 participants per show, with unlimited meeting time. [Learn more](#).

Figure 7. IDSA created a one-page webpage to gather COVID-19-relevant information to make it easy for their design community members to access the material and also stay connected (source: IDSA).

DDP 6 – Design for America (DFA). The keywords of DDP 6 are about virtual culture nurturing, community empowering, and accessible information (Figure 8). The goal of DDP 6 is to initiate a series of online events to support, connect, and empower designers and creative talents around the globe. For example, DFA has empowered its community by initiating online activities, digital communication, and creation tools and channels, such

DESIGN for AMERICA Days of Summer

DFA's response to COVID-19.
Design for America has always focused on using design for social good. Join our efforts and support the community.

DFAers Take Direct Action
The Emergency Design Collective: DFA Board Member Devika Patel
The Emergency Design Collective's goal is to generate solutions that can be immediately helpful and implemented by people, partners, and technical providers as we face new ways of working, caring for others, and accessing critical tools in response to the COVID-19 crisis. Check out to Devika Patel who is leading with their mission: Build around their projects, ranging from how to create all-home masks, prep for emergency room visits, and more.

re:3D Prints Medical Supplies: DFA Alumni Jeric Bautista
re:3D is providing access to 3D printers, 3D models, and distributes 3D printed face shields, PPEs, hand-free door pulls, as well as release of all of the 3D-printable open-source designs they've created. Check out to Jeric Bautista for his work on this incredible project! Join the open call for volunteers to help produce and distribute essential protective gear to those in need.

Navigating Disruption
Celebrate DFA Resilient Designers
Mentor Matchups

The global community is facing unprecedented challenges from the COVID-19 virus—preventing social distancing, manufacturing medical equipment, and helping friends and family adjust. But as a network with a shared vision of hope, DFAers have incredible strength to collaborate and use our abilities to create a better future for all.

DFAers are empowered to do more. We are fostering connections and inspiration, navigating disruption in the marketplace, and lighting the way in our local communities. This page will give us an insight into our initiatives for support. Together, we can make a difference.

Figure 8. DFA reconfigured its website to focus on communities' support for and with designers (source: DFA).

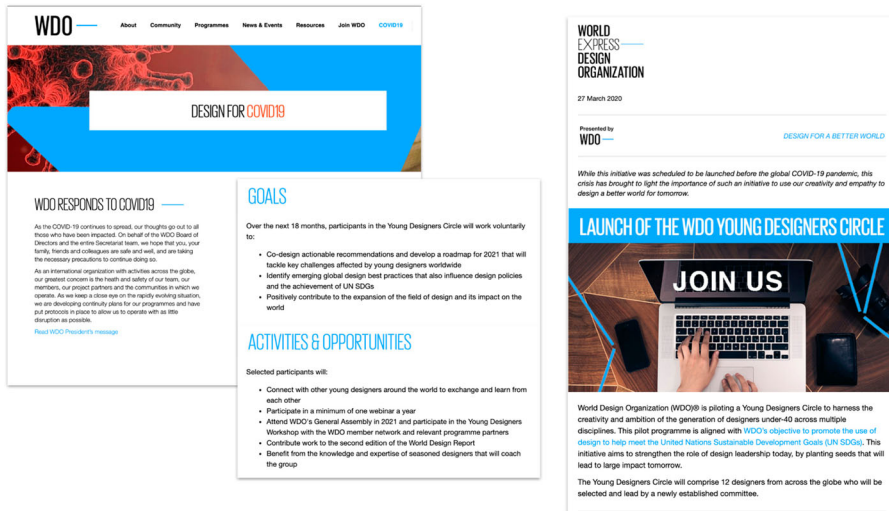


Figure 9. WDO initiated a new virtual community: Young Designers Circle in response to the pandemic (source: WDO).

as remote collaboration resources, celebrating DFA graduating seniors and suggested remote collaboration tools (DFA 2022).

DDP 7 – World Design Organization (WDO). The keywords of DDP 7 are about community building, co-creation process, and themed design challenges (Figure 9). The goal of DDP 7 is to be leveraged its original creative initiatives and communities to solve the pandemic-relevant challenges online. For example, WDO utilized its Young Designers Circle (YDC) to harness the creativity and ambition of a generation of designers under 40 across multiple disciplines (WDO 2021), to solve large complex, social-technological challenges, e.g. COVID-19-related topics (YDC 2022).

4.2.3. Category C – design company

In Category C, we studied three types of design companies: a design firm that focuses on participatory design (e.g. openIDEO), a well-known traditional industrial design firm (e.g. Whipsaw), and a design company positioned as a media representative (e.g. Fast Company). We wanted to gain their perspectives on the current pain points of DDP and its future.

DDP 8 – OpenIDEO. The keywords of DDP 8 are about co-creation, participatory design process, and themed design challenge (Figure 10). The goal of DDP 8 is to be launched co-creation conditions to allow online participants to express their unique opinions, co-create and exchange ideas, and come up with potential solutions. The DDP is positioned as a canvas for designers to solve complicated challenges collectively. For example, OpenIDEO not only provided COVID-19-related design challenges, but also offered insights about communication and behavior changes via reports and webinars (openIDEO 2022). OpenIDEO emphasized three pillars: (1) future learning experience, e.g. How might we empower educators, parents, and students to adapt to remote learning while

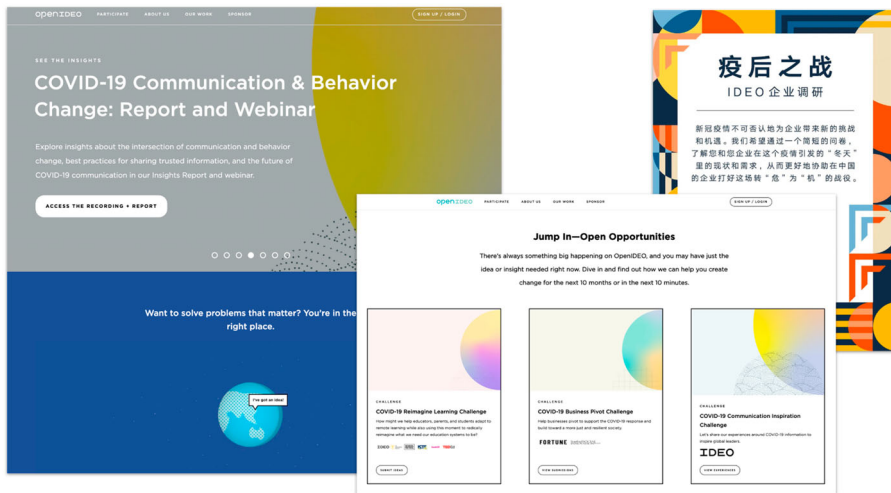


Figure 10. OpenIDEO leveraged its open platform and co-design process to jointly solve the pandemic problems with participants across the globe (source: OpenIDEO).

also using this opportunity to radically envision what we need our education system to be? (2) business pivot challenges, e.g. How might we transform business models to support the COVID-19 response and build toward a more just and resilient society? (3) communication inspiration challenge, e.g. How might we inspire global leaders by sharing our experiences with COVID-19?

DDP 9 – Fast Company. The keywords of DDP 9 are about new category, adaptive, and fast-paced update (Figure 11). The goal of DDP 9 is to establish a specific webpage to highlight the critical information that designers need to know in response to COVID-19. For example, Fast Company created a designated column regarding the COVID-19 update of design communities (Fast Company & Inc 2022).

DDP 10 – Whipsaw. The keywords of DDP 10 are about bridge between school and industry, mentorship, and new education model (Figure 12). The goal of DDP 10 is to be served as a virtual open design exhibition to help undergraduate design students and young design talents receive critiques of their works from selected industry experts. For example, Whipsaw repositioned itself from a commercial design brand to an open participatory platform to help undergraduate students and young talents receive feedback on their design works from senior design mentors (Whipsaw 2020).

4.3. General object-process diagram (OPD) of DDP

After synthesizing the information of ten different DDPs under three categories and the learnings from seven semi-structured expert interviews, we summarized and modeled the OPD of DDP. OPD, a system diagram (SD), is a visual part of OPM consisting of four components/elements: objects, processes, status, and links (Table 3). In the study, we decomposed DDP's system into two layers. Figure 13 shows the first layer of SD and,

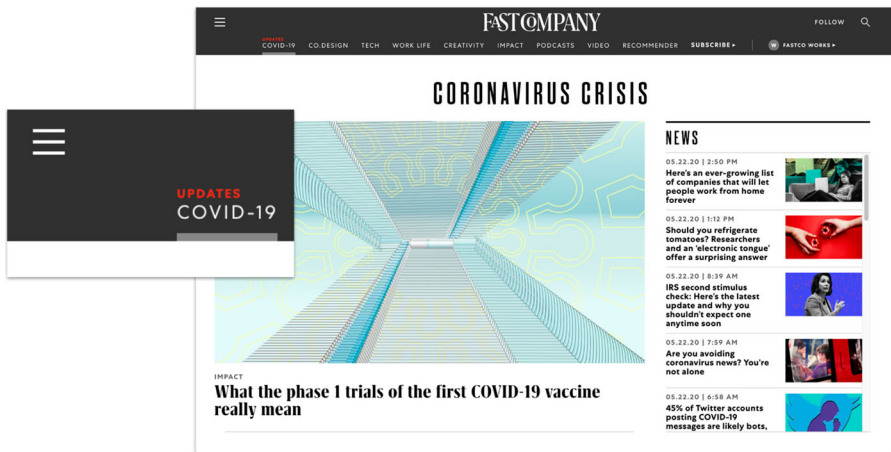


Figure 11. Fast Company quickly created a section of COVID-19 to inform the audience of the latest information and provide a transparent communication channel to express ideas (source: Fast Company).

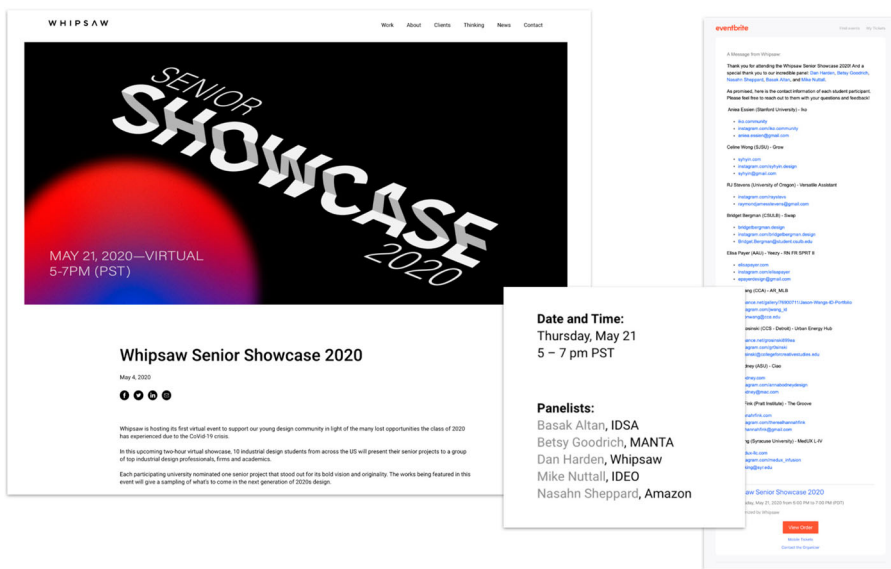


Figure 12. Whipsaw turns its brand's online identity from a design solution provider to an education service provider by connecting industry experts with students' graduation shows and giving students not only constructive feedback in design but also invaluable mentorship in life (source: Whipsaw).

here named level 0, whereas **Figure 14** shows the second layer, level 1, where we zoomed into the key process component, Good Design Promotion, in the center. We hypothesized that one of the key visions of DDP was to promote good design, and started to consider its key stakeholders as objects: participants, jury group, designer group, company and people who worked in DDP, and also resources: staff, equipment, funding. Design community culture and the involvement of the government were the two elements we considered.

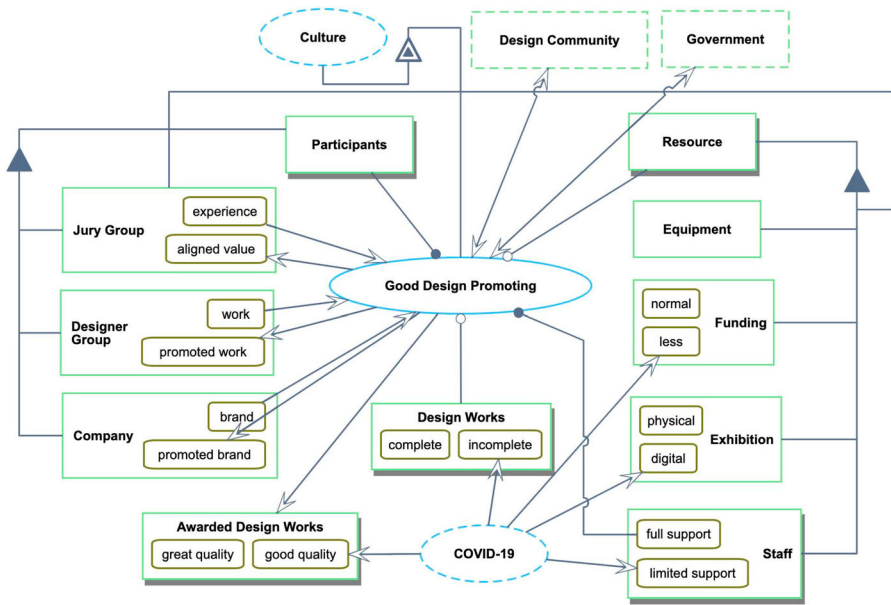


Figure 13. DDP's System Diagram (SD) level 0.

We specifically added COVID-19 as a transformation driver to help us simulate the pandemic situation. We applied Figures 13 and 14 as our OPD system model to analyze the ten DDPs and summarized our research insights and suggestions in the conclusion section.

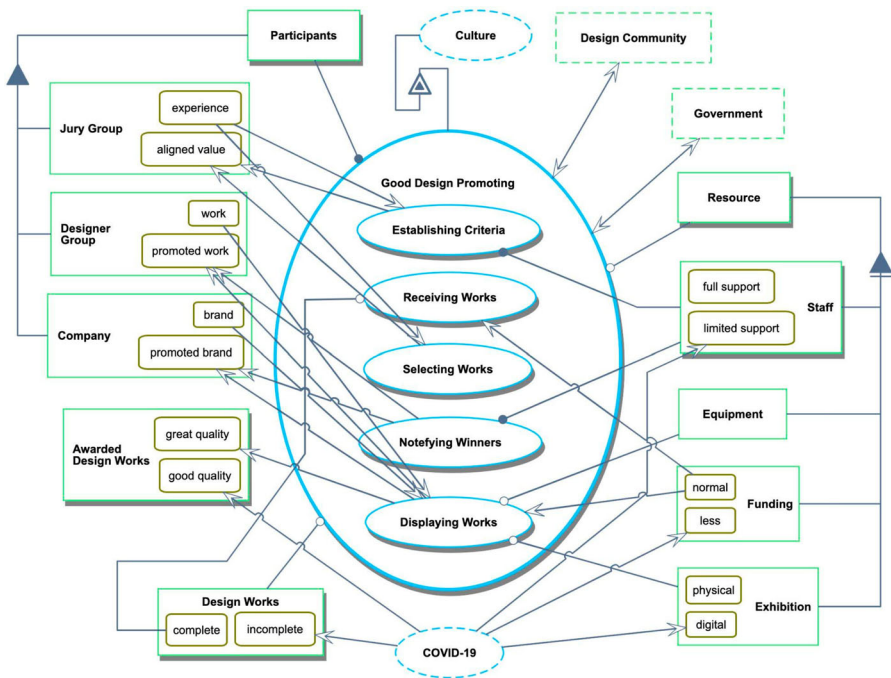


Figure 14. DDP's System Diagram (SD) level 1.

5. Discussion

After synthesizing our learnings and data from the literature reviews, seven expert interviews, and ten case studies of three types of DDP, we applied systemic approaches originating from the ARIES framework to review current DDP models and envision the future possibilities in terms of its service offerings, business models, and market positions. From [Figure 1](#) of the ARIES framework, we can consider the suggested DDP (enterprise) strategy through the concept of viable service originating from public service design field through three angles ([Menachemson 2013](#)): (1) cost perspective – Can we cover the cost, including time, labor, equipment, and other tangible and intangible items consumed or generated during the organizational transformation of DDP? (2) administration perspective – Can we execute the strategy with our expected approach? and (3) strategic perspective – Will the blueprint that we designed and planned guide us in the direction and outcome we are aiming for in the longer term? The above three angles can help us understand the enterprise landscape, perform stakeholder analysis, capture current architecture, create a holistic vision of future, generate alternative architecture, decide on future architecture, and develop an implementation plan. However, in this study, our discussion was inspired by applying the ARIES enterprise element model.

5.1. Reshape the value of DDP beyond award recognition

During the pandemic in 2020, people had very limited physical space, but unlimited digital space that we probably hadn't fully leveraged or thought about its potential application and value. This situation naturally made most DDPs reconsider their service offering, business model, and organizational culture. The pandemic has forced most DDPs to reposition themselves from celebrating award-winning moments for either individual designers or companies to broadening their design professional services, e.g. Core77 Design Award has repositioned itself as an educational platform to bridge the gap between the design practice and design academics and to help young designers to find mentors via their Core77 Student Showcase initiative.

Meanwhile, we are thinking about what other social benefits inspired by the pandemic DDP can bring to the design communities and beyond to their creative culture to make a bigger social impact. Innovative service offerings are tied to its service operation and operation principles, which can enable a paradigm shift, e.g. its value proposition, service elements, and organization typologies from social, technological, and organizational perspectives. In addition, a meaningful and positive transformation of DDP will increase the expectations of participants and other key stakeholders in ecosystems to build solid capabilities and capacities of design services for more efficient and effective use of resources. Reshaping and redefining the position of the future DDP service strategy can help future DDP contribute more social value and improve the outcome and approaches of DDP services required from the pandemic and the potential organizational transformation.

5.2. Develops DDP's systemic approach to reframe and solve problems

From our research and expert interviews, we wonder from a DDP's perspective if they have created or developed a systemic approach to reframe and ideally solve the

complex problems around organizational change (De Weck, Roos, and Magee 2012). In *Architecturing the Future Enterprise* (Nightingale and Rhodes 2015), the authors proposed the systemic approach to study an enterprise from three stages: (1) enterprise element model, (2) architecting process model, and (3) analysis technique. We referenced this framework to discuss how to apply systemic approaches to reframe and solve the problem relevant to DDP.

COVID-19 Design Challenge is a great example of developing a systemic approach with a shared vision. It is a collaboration project that includes more than 180 challenges between three parties – WDO, IBM Design, and DFA – to solve the world health crisis caused by COVID-19. They proposed some questions to participants, such as what in the eyes of designers are the most important and urgent challenges that they could help to address regarding the coronavirus crisis? The shared objective was stated on the *COVID-19 Design Challenge* website ‘Mobilize designers globally to contribute their skills to the challenges of the coronavirus spread, turn anxieties into action, and use design thinking skills to help us all get through the pandemic’. This objective better motivated and informed people and empowered them to execute each DDP to build a systemic approach to reframe and solve these challenges (WDO, IBM Design, and DFA 2020).

5.3. Envision future DDP through ARIES enterprise element model

The enterprise element model can help us study an organization’s structure in a systemic approach through ten elements from broader scope to the core items: ecosystem, stakeholders, strategy, information, infrastructure, products, services, process, organization, and knowledge. In the context of DDP, we reconsider the ecosystem in a dynamic perspective with short-term goals and long-term visions of DDP, especially the amount of effect caused by the pandemic. The limitation of physical space for people, facemask policy, and constrained interaction with others naturally triggered users’ behavioral changes, including their mental health. These situations have influenced people’s decision-making process and the emerging support they want from DDP, which is reflected in its business models, service offerings, and positioning. Therefore, we applied the ARIES enterprise element model to help us analyze comprehensively and better understand and suggest the service touchpoints that DDP can provide in the future in order to adapt to organizational transformation. [Table 6](#) lists questions based on our analysis and our learnings to summarize the previous research and inform clear directions to reshape the DDP in the context of the pandemic.

6. Conclusion

Based on our literature review, expert interviews, and DDPs’ website research, we conclude the paper with the following four key takeaways ([Figure 15](#)) and suggestions for future studies on this topic. The summary gives a principle-level direction to DDPs internally and externally guiding DDP to overcome these social-technological systemic challenges triggered by the pandemic and to make positive social impacts on design communities by creating value not only for individuals, but also for communities and companies.

Table 6. Apply ARIES enterprise element model in the context of DDP.

Element	Description in the context of DDP
Ecosystem	How does DDP make alliances with other different types of DDPs to partner with more resilient organizational/platform structures with sound business models and service offerings to make ecosystems not only sustainable, but also meaningful to contribute invaluable social impact through DDP?
Stakeholders	Besides the designers and design companies who submit their work to DDPs, who are other key stakeholders that will influence DDPs? We also need to consider the people who use, invest in, partner with, and contribute to, and benefit from DDPs in various scenarios.
Strategy	Suggested DDP strategies need to be designed in a way that is flexible to adapt to transformational conditions, encapsulating DDP’s functions with different modules, and considering the essential needs of participants connecting to business potentials.
Information	Since DDP is a digital-based platform, we can consider the future DDP events combined with offline activities e.g. exhibitions and workshops to promote omnichannel service offerings to bring more digital traffic and attention from the public.
Infrastructure	What are the fundamental digital and physical infrastructure that we can use to improve DDP services through four angles: people, product, process, and platform to elevate the current design platform.
Product	During the transformational era, the definition of a DDP product can shift from a one-single-usage product to scribed service offerings that can be modified and evolved based on people’s habits, needs, and expectations.
Services	Apart from award recognition services for individuals or companies, we can consider other services that can motivate participants of DDP by increasing their engagement level, building design community and connections, helping people grow, and cultivating creative culture within DDP.
Process	The typical DDP process can think about and expand its process from award evaluation to people’s growth and empowerment.
Organization	The boundary of DDP has been redefined, especially since the pandemic has fostered the transformational process. DDP can be viewed as an organization for internal employees, as well as a platform for external participants.
Knowledge	Knowledge includes the section DDP wants to provide to participants and design communities, whereas another part is that DDP needs to generate by itself for the purpose of updating its system or services.

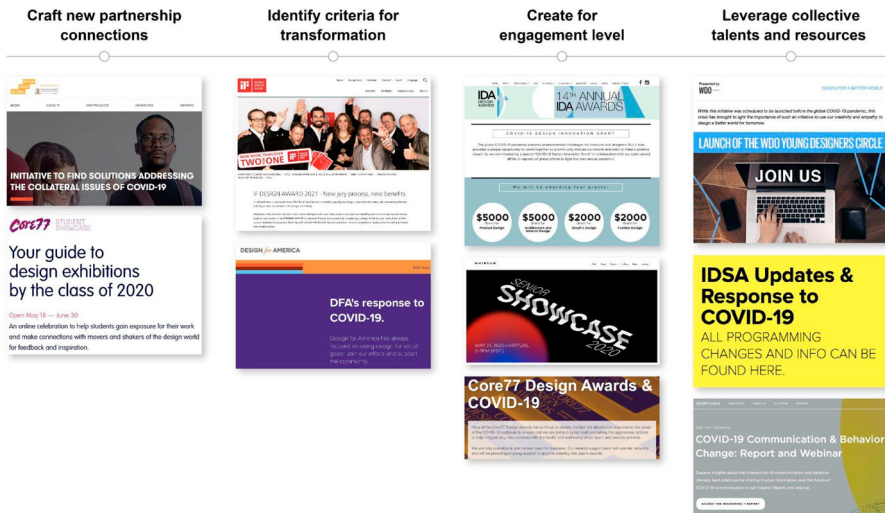


Figure 15. The landscape of DDPs and four key takeaways.

6.1. Key takeaways

We used the ten DDP examples, seven semi-structured expert interview results, and relevant literature reviews to distill them into four key insights and to build four

representative conceptual OPD accordingly to match the qualitative result and quantitative outcome of the study. (1) Craft new partnership connections; (2) Identify criteria for transformation; (3) Create and extend participants' engagement level, and (4) Leverage collective talents and resources, as we summarized into four key learnings. Each key learning paired with one generalized OPD to reflect its learning and re-emphasize the ten DDP case studies we gathered. There are various versions to build multiple versions of OPDs depending on different scenarios and perspectives. Thus in this study, based on our research insight, we generalized four OPDs to match the four key learnings. We assumed one of the goals of DDP is to promote good design (oval in the center of OPD) as a starting point to compare, analyze, and conclude the learnings and insights. In each OPD, at the bottom of the figure, there was an oval shape with a dotted line representing the influence of COVID-19.

6.1.1. Craft new partnership connections

Figure 16 shown one general OPM model of DDP3 – Core 77 Student Showcase and DDP4 – GGS indicated the critical factor to form the bounding regarding collaboration on business partnering, culture cultivating, strategy establishing, and community building. A digital design platform needs to extend its design capabilities beyond just giving awards or recognition. Instead, it can empower award winners and designers by offering professional design knowledge or service, e.g. manufacturing to translate the design works from concept level to product on the market. For example, DDP4 – Global Graduate Show (GGS) not only gives winners awards and recognition but also helps them find the right investors to make their concepts into products by expanding GGS's partnership with the government, industries, and design communities.

6.1.2. Identify criteria for transformation

Figure 17 represented the DDP's structure originated from DDP2 – iF Design Award and DDP6 – DFA. We want to indicate the importance of highlighting how to re-establish

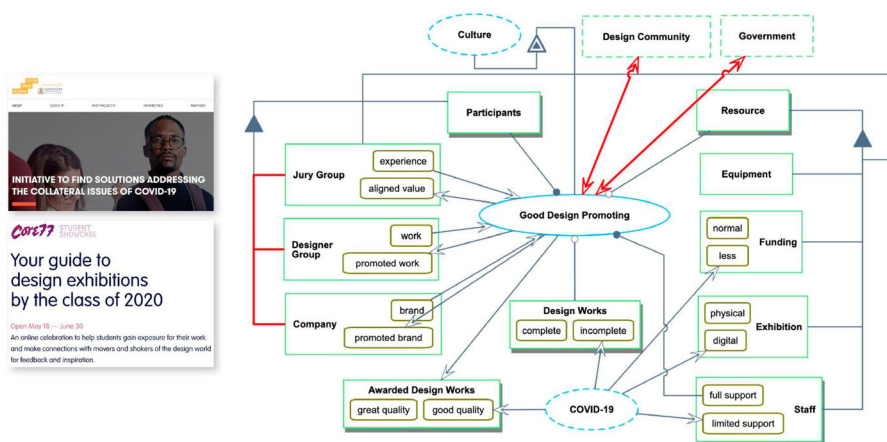


Figure 16. OPD of crafting new partnership connections.

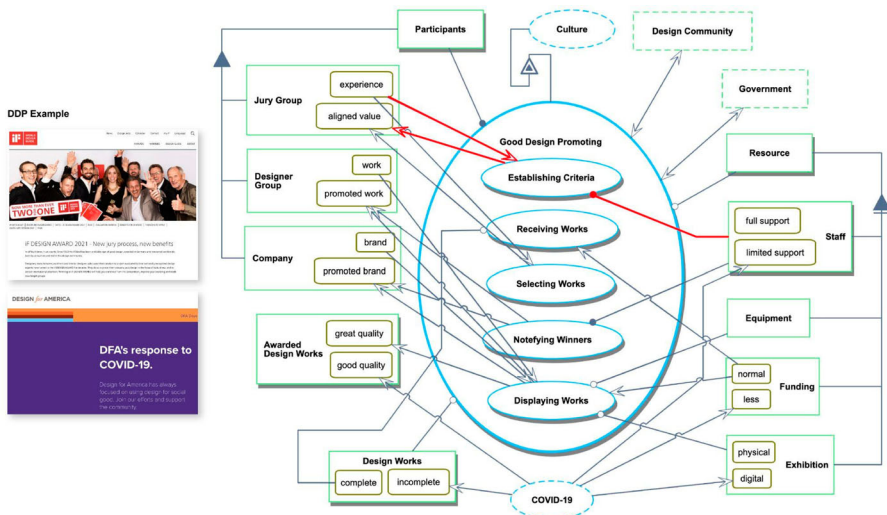


Figure 17. OPD of criteria for transformation.

DDP’s design award selection criteria and jury process under the organizational transformation caused by the pandemic. The red line in Figure 17 presents the relationship between establishing new jury criteria and the resources of people involved, DDP needs to collaborate with not only the jury group but also the DDP staff. A digital design platform needs to reconsider its evaluating criteria for winning design works. For example, in early 2020, iF Design made its jury process as transparent and open as possible by providing each participant with a tailor-made evaluation report. iF Design also especially emphasized the criterion of social impact among all judging criteria: idea, form, function, differentiation, and impact.

6.1.3. Create and extend participants’ engagement level

A digital design platform needs to make more people engaged with its system besides awarding winners or companies. For example, DDP3 – Core 77 Student Showcase creates more service touchpoints by providing students critiques and constructive feedback from design professionals, industry experts, and academics around the globe.

Figure 18 indicated the importance of increasing the engagement level of DDP. The four red lines show that DDP needs to make strong bonding with participants, design communities, the government, and the relevant resources about DDP. The four case studies we mentioned were: DDP1, DDP3, DDP9, and DDP10. For example, DDP1 – IDA provided financial incentives (design prizes) across four design categories: (1) product design; (2) architecture and interior design; (3) graphic design, and (4) fashion design to grab people’s attention to receive more design works under the theme around the pandemic.

6.1.4. Leverage collective talents and resources

A digital design platform needs to act strategically by gathering and partnering with other design platforms through sharing resources and forming meaningful social webs. The three red links displayed in Figure 19 also indicated how DDP5, DDP7, and DDP8 leveraged their internal resource and talents to help the organizational transformational

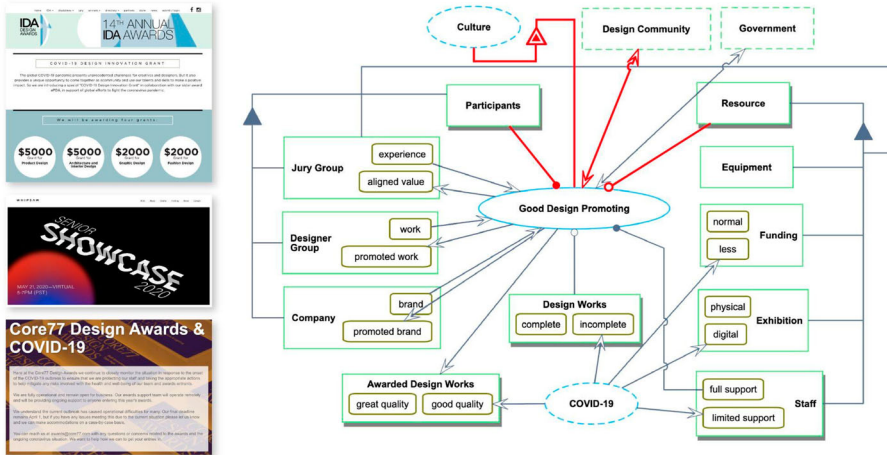


Figure 18. OPD of creating for the engagement level.

process under the pandemic, which also help the leadership team to re-envision their DDPs by composing and de-composing its internal structure. Take DDP7 – World Design Organization (WDO) Young Designer Circle as an example. It shows how WDO purposefully leveraged the knowledge and the power of global creative talents together to solve large complex systemic challenges, e.g. COVID-19-related topics, and scale invaluable positive social impact.

6.2. Further research

This experimental study was carried out in 2020, in an early stage of the pandemic. Therefore most of the data and information we captured were based on literature reviews and the

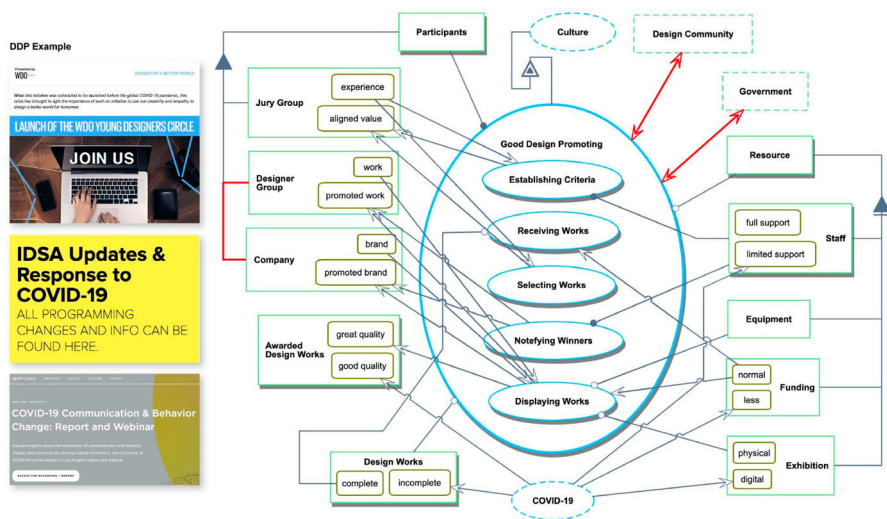


Figure 19. OPD of collective talents and source.



authors' experiences and observations at that time. Even though we only did seven semi-structured expert interviews, online DDP research, and literature review, there are many hypotheses and research questions that are valuable for future research to discuss, explore, and validate. Therefore, we suggest the following three research areas for further studies: (1) Redefine the term DDP; (2) Re-establish systemic analysis research approaches, and (3) Reconsider critical elements in ecosystems in the context of transformation.

6.2.1. Redefine the term digital design platform (DDP)

In the study, we roughly define DDP into three categories – design competition, design professional association, and design company – to discuss the pros and cons of each type of DDP. In a further study, we also want to consider how to redefine the term DDP in a more solid, unbiased, comprehensive, and inclusive way to help us better redesign the design process, service offering, business models, and organizational culture during the era of the pandemic and even prepare for transformational changes in the post-COVID time. In addition to clarifying the broader definition of DDP, the further question we were curious to explore is how design can be made into a science (Suh 1990). Is it possible to discuss 'design science' and how does this connect to DDP impacting its service, business, or even the perception people have? Will another paradigm shift occur in DDP and the design domain, if we might quantify people's behavior, emotion, and decision-making process?

6.2.2. Re-establish systemic analysis research approaches

We applied OPM – a module-based analysis methodology in the field of system engineering – to conduct the experiment and analyze the pros and cons of each DDP from its service offering and organizational structure, to business implications and applications. Besides, in using OPM, what are the other system engineering/architecture methodologies that can help us better measure the effectiveness and the quality of the design platform transformation? Design Structure Matrix (DSM) could be a useful analysis tool with its benefits such as intuitive learning and visual representation. DSM can be also described as a system network modeling tool that served as highlighting the system's architecture to show how each element in a system composes a system with different interactions (Eppinger and Browning 2012). In addition, DSM not only can be applied accurately to define a typical system's architecture, but also to analyze system architectures of processes or organizations (Engel 2018). Besides, during the period of COVID-19, how do we equip ourselves not only to serve as researchers, but also, from the side of DDP, to learn more systemic approaches, establish a sound mindset, and gain the right capabilities to overcome the challenges?

6.2.3. Reconsider critical elements in ecosystems in the context of organizational transformation

In the context of organizational (DDP) transformation, most elements of DDP in systems and sub-systems we thought were stable have become unexpected factors or had unpredictable outcomes. Take an analogous concept in the system engineering domain. The term 'illities', such as quality, reliability, safety, and flexibility, can be used as a way to describe the characteristic of systems that operate out of functional constraints or not in system requirements. It is not easy to draw a clear line between system/DDP design error and operation error. Thus, system safety or system design on human error is

another aspect we need to consider (Leveson 2017). For example, DDP users (designers, design practitioners, and design companies) no longer crave the success of winning design awards. Instead, in the era of change, people have become more sophisticated not only to achieve their personal goals (e.g. winning design awards to get recognition), but also to have communities' support (e.g. group learning, mentorship opportunities, new service offering, and business models). Therefore, for further study, we need to reconsider other critical and emergent elements that we haven't thought of before in systems (DDPs) or the elements we should improve in, including new criteria to measure the success of DDP in various dynamic conditions of change.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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