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The Role of Industrial Design for the Sustainable Disaster Management in Türkiye

Türkiye'de Sürdürülebilir Afet Yönetimi için Endüstriyel Tasarımın Rolü

H. Tengüz ÜNSAL[1]

Öz

Bu makale, Türkiye'de sürdürülebilir ve etkin afet yönetimi için afet sonrası barınma alanlarına yönelik yeni ürün ve hizmet sistemlerinin geliştirilmesine endüstriyel tasarım disiplininin katkılarını tartışmayı amaçlamaktadır. Makale, afetlere müdahalede önemli bir oyuncu olan ve Avrupa'nın en büyük barınma sistemi üreticilerinden biri olan Türk STK'ya bağlı Barınma Sistemleri Şirketi'nin yürüttüğü tasarım ve Ar-Ge gibi yenilikçi süreç faaliyetlerine odaklanmakta, Barınma Sistemleri Şirketi'nin organizasyonel yapısı içinde yürütülen inovasyon faaliyetlerinde endüstriyel tasarım disiplininin rollerini araştırmaktadır. Vaka çalışması kapsamında, Barınma Sistemleri Şirketi'nin yaratıcı süreç faaliyetlerinde tasarımın rolünü ve tasarım süreçlerinin doğal iş akışını anlamak için iş süreci analizi yapılmıştır. Araştırma Barınma Sistemleri Şirketi'nin son dönemde sosyal girişimciliği destekleyen gelir getirici faaliyetlere geçtiğini ve bu çabaları toplumsal faydaya dönüştürmeyi hedeflediğini ortaya koymuştur. Bununla birlikte, Barınma Sistemleri Şirketi'nin ana faaliyetlerinin öncelikle üretim odaklı olduğu, sınırlı endüstriyel tasarım kapasitesine sahip olduğu, inovasyon faaliyetlerinde dış etkilere kapalı süreçler gerçekleştirdiği, dış kuruluşlar ve paydaşlarla açık bilgi paylaşımına yönelik yatayda kısıtlı iş birlikleri gerçekleştirdiği tespit edilmiştir. Elde edilen bulgulara dayanarak, Barınma Sistemleri Şirketi'nin afet yönetiminde kurumsal ve finansal sürdürülebilirliği gerçekleştirebilmesi için yenilikçi süreç faaliyetlerinde endüstriyel tasarımı daha etkin hale getirmesine yönelik stratejiler önerilmiştir.

Anahtar Kelimeler Endüstriyel tasarım, afet yönetimi, kurumsal ve finansal sürdürülebilirlik, STK'lar ve sosyal girişimcilik, barınma sistemleri

ABSTRACT

This article aims to discuss the contributions of the industrial design discipline to the development of new product and service systems for sustainable and effective disaster management in Turkey. For this reason, the article focuses on innovative process activities such as design and R&D carried out by the Turkish NGO-affiliated Shelter Systems Company, a major player in disaster response and one of the largest shelter system manufacturers in Europe. This research explores the roles of the industrial design discipline in innovation processes, as well as the organizational characteristics of the innovation activities carried out in the Shelter Systems Company. Within the scope of the case study, a business process analysis was conducted to understand the role of design in the creative process activities of the Shelter Systems Company and the natural workflow of the design processes. The research demonstrated that the Shelter Systems Company has recently shifted to income-generating activities that support social entrepreneurship, aiming to transform these efforts into social benefits. However, the main process activities of the Shelter Systems Company are primarily manufacturing orientated. Its industrial design capacity is limited, its innovation process is closed to external influences, and its horizontal collaborations for open information sharing with external organizations and stakeholders are restricted. Based on the findings, this research proposes strategies to make industrial design more effective in the innovative process activities of the Shelter Systems Company in disaster management.

Keywords: Industrial design, disaster management, corporate and financial sustainability, NGOs and social entrepreneurship, shelter systems

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INTRODUCTION:

Rapid urbanisation, climate change, unsustainable consumption of natural resources, deterioration in ecosystems and global epidemic factors have deepened the social and spatial consequences of natural disasters all over the world in recent years. According to the Sendai Framework for Disaster Risk Reduction adopted at the Third World Conference of the United Nations, disasters are events with a high level of chaos, which can trigger different social crises if not managed effectively (Sendai Framework, 2015). In order to make the chaos created by disasters manageable, central, and local administrations and NGOs should take coordinated and rapid action to reduce disaster risks (Sendai Framework, 2015). In Türkiye, Disaster and Emergency Management Authority (AFAD) is the authorised institution that works to prevent disasters and minimize disaster-related damages, plan and coordinate post-disaster response. AFAD is the sole authority on disasters and emergencies which cooperates with various government institutions and non-governmental organizations depending on the nature and severity of individual cases. The Turkish NGO selected as a case study is the largest non-governmental organization in Türkiye, which has been active for more than 150 years and is involved in humanitarian aid such as nutrition and shelter to respond disasters and works in coordination with AFAD at home and abroad.

The Kahramanmaras earthquakes that Türkiye experienced on February 6, 2023 were recorded as one of the biggest disasters of the century in terms of area covered, and destruction caused. While AFAD coordinated all aid to the region, the Turkish NGO met basic humanitarian needs such as nutrition and tents. However, the magnitude and effects of the earthquake left the aid provided to the disaster area inadequate at many points, and many institutions operating in the region were publicly criticised. While some of the failures in this regard could be explained by organizational dysfunction, other criticisms have been the lack of products and services in quality, variety and quantity for the needs of the disaster area. The earthquakes centred in Kahramanmaraş have revealed that in order to respond disasters more effectively , it is important for disaster-related institutions to develop new products and services suitable for the social and spatial realities of the disaster-affected areas. It has also revealed that this is possible if disaster-related institutions strengthen their relations with other stakeholders and ensure financial and institional sustainability.

This article aims to discuss the contributions of the industrial design discipline to the development of new product and service systems for sustainable and effective disaster management in Türkiye. For this reason, the article focuses on innovative process activities such as design and R&D carried out by the Turkish NGO-affiliated Shelter Systems Company, one of the largest shelter system manufacturers in Türkiye and Europe. The company, which produces tents, textiles, and personal protective equipment, is a subsidiary of the Investment Group of the Turkish NGO. This research will explore the roles of the industrial design discipline in innovation processes, as well as the organizational characteristics of the innovation activities carried out in the Shelter Systems Company.

In the theoretical framework section, the article will discuss the role of industrial design and design principles in disaster management cycles. The following section aims to develop strategies from an industrial design perspective, based on research findings, to design more effective products and services for disaster management within the Turkish NGO.

1. Theoretical framework

In recent years, the increasing frequency of disasters and the destructive effects they create have turned the attention of the industrial design field to the issue of disasters. Industrial design, motivated by the gravitational force of the market economy as a professional field and focusing on product design for industrial markets, has also focused on natural and social problems such as the needs of socially disadvantaged groups and environmental problems since the 1970s, but the role of

industrial design in disaster management has been discussed less within this approach (Papanek,1973; Papanek,1983; Papanek, 1995; Triatmodjo, 2021; Ünsal,2024). As Avendano et al. (2017) point out, designing a disaster-resilient society is a new niche area in the industrial design profession (Also see Huang & Anderson, 2011; Noh et.al., 2014). The World Design Organization (WDO, 2024) points out that 'design' plays a critical role in helping societies and cities respond to future humanitarian crises as natural disasters increase in frequency and impact. WDO emphasises that designers should unite to build safer and more resilient futures, from improving existing design infrastructure ahead of a disaster to ensuring an active presence on the ground after a disaster (WDO, 2024). Manzini (2015) points out that esustainable management of disasters is possible with a structure based on problem solving, social benefit, innovation and design system thinking.

The literature on disaster management in the industrial design discipline mainly focuses on the contributions and the principles of industrial design in terms of products, services, and systems. Avendano et al. (2017) suggest that industrial designer can make significant contributions in the innovation creation process together with other design and engineering-based fields involved in this process, especially in post-disaster management.

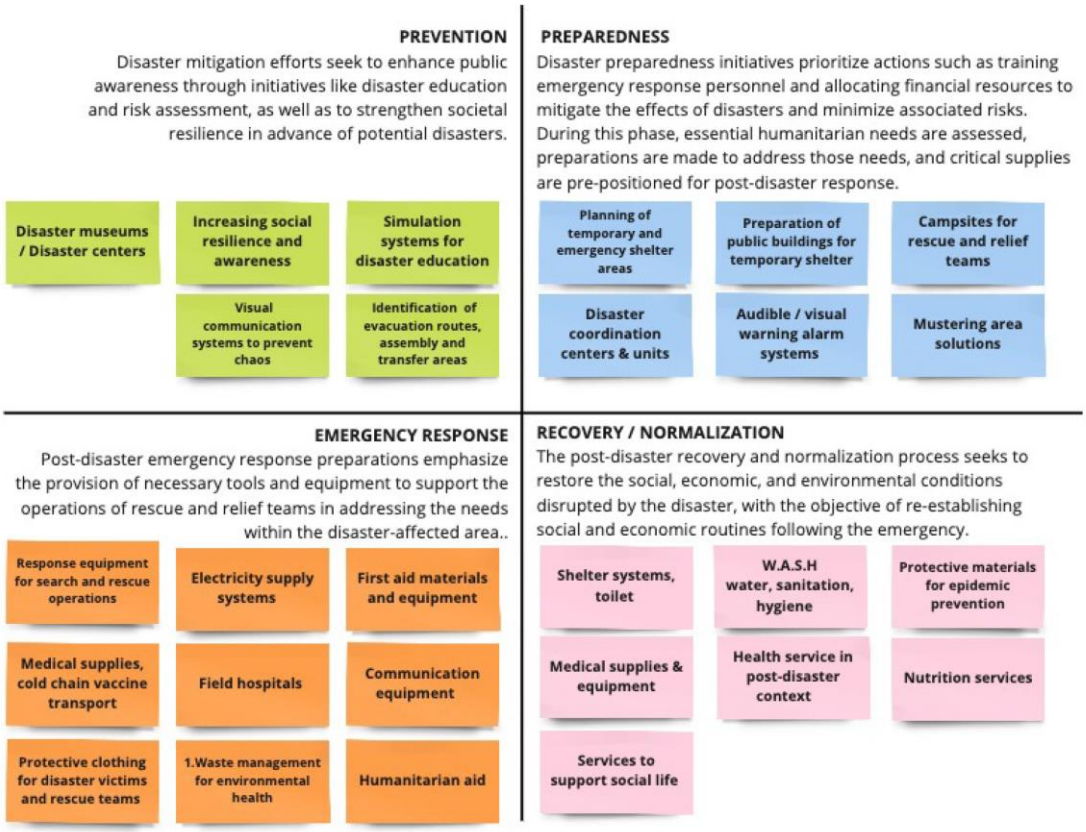

Figure-1. Disaster management cycle and industrial design service areas

Noh et al. (2014) present Disaster Prevention Design (DPD) as an essential design activity in order to cope with dangers expected in future societies as well as realizing securable environments. According to Noh et al. (2014), DPD can be divided into prevention design, preparedness design, response design, and recovery design, in accordance with disaster management cycless: 'prevention', 'preparedness', 'emergency response', and 'recovery and mitigation'. While disaster prevention studies focus on social issues such as raising social awareness, training, risk analysis, identification of needs and problems, disaster preparedness studies consist of disaster action plans, training of response teams, identification of basic human needs, preparation of financial resources, studies aimed at raising awareness and consciousness that will increase the cognitive proximity of the public

to disasters and development of information sharing systems (Noh et.al., 2014) [refer to Figure-1]. Design services that can be used for disaster response are defined as the design of product systems and services such as emergency response, rescue, and communication (Noh et al., 2014). Recovery design is defined as design studies carried out in order to normalise the socio-economic and environmental conditions destroyed by the disaster in disaster management (Noh et al., 2014). These studies aim to minimise the effects of disasters, and after the rescue and debris removal operations, to proceed with the rehabilitation process in order to re-establish the social and economic routine.

As pointed out by international institutions and organizations, sensitivity to local characteristics and capacities, logistics factors, environmentally friendly strategies, corporate and financial sustainability and stakeholder cooperation are important principles in all products and services to be designed for disaster areas (Sendai Framework, 2015; Sphere, 2018). On the other hand, theoretical and methodological discussions such as experience design, participatory design, environmental and social sustainability, eco design, social innovation and social design (Goldschmidt & Rodgers, 2013) developed within the industrial design discipline provide important insights into the methods and tools for the design of products and services to be developed to prevent the society againt disasters effectively. These different approaches to industrial design can work harmoniously in co-operation and provide guidance for the effective use of design in disaster management.

The first principle is that the designer should produce product, service, and system solutions in place and in context in natural and social disasters. As stated by disaster experts, it is not always possible to use universal solutions in products, services, and systems for normalising life after disasters. Topography and climatic conditions (summer and winter earthquakes), differences in needs arising between earthquakes expected in cities and those in rural areas, different cultural structures of localities, especially the needs and expectations of vulnerable groups such as gender, women, children, elderly, disabled people differentiate the expectations from the product service systems offered in the field.

"Participatory design" and "co-design" approaches developed on the axis of user orientation aim to gain innovative design ideas by focusing on the nature of the users interacted with (Dell'Era & Landoni, 2014; Toros, 2020). Therefore, it provides important expansions in terms of methodology in producing community-specific products and services in disaster management. In these design approaches, the user is included in the design process to identify insights and understanding based on users' experiences, and to meet their needs, desires, wishes and demands (Sanders, 1992). The designer is expected to empathise with the thoughts and feelings of the user(s). A focus on user values and consideration of environmental factors are encouraged in a user-centred design approach (Veryzer & Mozota, 2005; Toros, 2020). Naturally, the user who is waiting for a solution to his/her problems is also the disaster victim. The user-centred approach suggests that the solutions of designers should be culturally and physically compatible with the locality. The designed product communication language should not cause loss of meaning in the user. For the designer, all disaster victims, especially vulnerable groups, should be considered as important solution partners within a paticipitory design approach. However, information gaps about target vulnerable groups awaiting post-disaster services have not yet been sufficiently studied from the perspective of designers (Anderson, 2005; Jabry, 2002). Research to identify types of vulnerability will provide opportunities to meet the specific needs of target vulnerable groups after a disaster.

Another important issue for actors aiming to rebuild social life in post-disaster cycle is the unsustainable production and consumption chain. In this sense, the 'circular economy' (Wastling et al., 2018), which aims to keep the value of products, materials, and resources in the economy as long as possible and minimise waste production, provides important insights for disaster management. In "circular design", which emerged in order to support the circular economy (in conjunction with eco-design), the goal is to use materials and services efficiently and to extend the life span of product services by putting the issue of environmental and economic sustainability at the centre. Therefore,

the principle of reverse disaster logistics gains importance when it comes to product service design (shelter, toilet, etc.) for humanitarian aid after a disaster (Toraman et al., 2023). In the circular design approach, it is expected to support the reuse of durable product service systems (long life, ease of maintenance, repair, assembly, storage, and transport) and to maximise the use of existing resources. In addition, considering the principles of collection and transformation after the product service is completed and preventing waste generation and bringing it into the economy are among the design criteria to be adopted.

Supporting logistic solutions through on-site modular installation principles, ensuring production from accessible materials at local standards, endeavouring to build disaster response activities on local capacities are other important design criteria for problem solving in the on-site context. Collaboration with local manufacturers and, where necessary, regional design suppliers is important to support integrated innovative process activities. In an environment where services cannot be delivered, it should be made possible to prepare and share guidebooks for do-it-your-self product and service solutions that support practical solutions at the local level in order to support the self-sufficiency of disaster victims and to include disaster victims in the construction process as solution partners.

Developing product and service systems as price effective as possible is another principle that should be considered in the design of products and social services for disaster management. Market economy cannot be the driving force for developing product system services in disaster prevention design. On the other hand, the issue of financial and institutional sustainability is important for NGOs, which assume a central role in humanitarian aid services. The institutional sustainability of NGOs depends on improving their technical, technological, and managerial/organizational capacities as well as their financial security. Industrial design has the potential to make a significant contribution to increasing the investment capacity of the NGOs and other actors with the added value it can create.

Another important principle for the effective development of product and service design for disasters is that actors involved in disaster management should tend towards multi and interdisciplinary co-operation and open information sharing at every stage of disaster management. In new generation innovation models, industrial design operates within the interdisciplinary organizational structure required by innovative processes. It views sees the industrial design not only as an in-house activity of manufacturing industries, but as one that effectively incorporates external players, such as design consultancy firms, research and application centers, R&D laboratories, and academia (Hobday, 2005; Ünsal, 2016). The following sections will first discuss the methodology chosen for the research and then focus on the creative process activities such as design and R&D carried out by the Shelter Systems Company for disaster response, the organizational structure characteristics of innovation activities, and the roles of the industrial design discipline in these innovation processes.

2. Research Methodology

Qualitative research method was adopted in the present study. Within the scope of the case study conducted for this study, the focus was on the product services and design processes of the Shelter Systems Company, which provides services for the normalisation of social life after disasters. In order to collect data within the scope of the case study, (i) interviews were conducted with former managers/employees who were involved in the design process activities and were familiar with internal business processes, (ii) document research was conducted through corporate resources such as annual reports, strategic plan documents, product catalogues, (iii) observations were made to determine the organizational infrastructure of the company.

The Shelter Systems Company was selected as a case study due to the following reasons. Firstly, the company includes creative process activities such as design and R&D, and secondly, it is the

producer of many other NGOs, public institutions and organizations that carry out humanitarian aid services at global and national levels. Within the scope of the case study, a semi-structured question technique was prepared in order to make inquiries regarding the design processes through interviews. Two former managers/employees interviewed did not give permission for their names to be mentioned in the article.

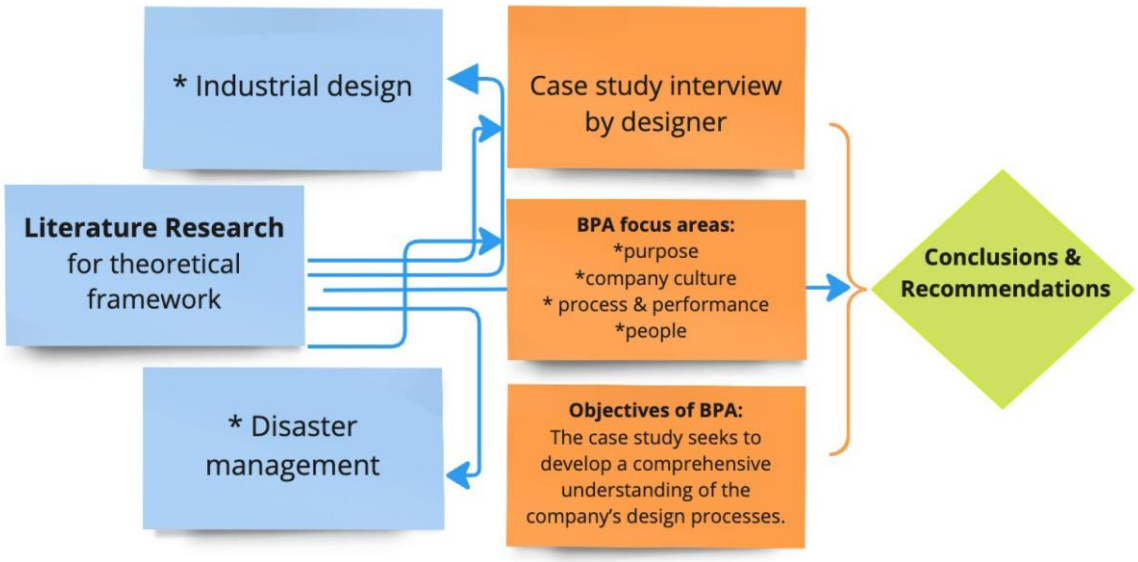

Figure-2. Structure and stages of the study

A *Business Process Analysis (BPA)* was conducted to understand the role of design in the creative process activities of the Shelter Systems Company and the natural workflow of the design processes, and to create a detailed picture of the creative process activities [refer to Figure-2]. BPA, developed by Champy (1995), is an analysis method used to describe in detail 'how and in what way' innovative process activities are handled in the process of transforming inputs into outputs. BPA, which essentially aims to develop best practice tools, is a method used to improve the performance of existing innovative process activities and to audit and review business process design outputs (Hammer & Champy, 2009). BPA aims to identify the factors that cause disruptions in production processes and redevelop the processes. Within the scope of the case study, in order to make BPA regarding innovative process activities, four issues identified by Champy (1995) were focused on; *'purpose', 'culture', 'process and performance'* and *'human' resources*. The interview questions were prepared to define the role of industrial design in the product service development process under the topics determined for the BPA.

Under the heading 'purpose(s)', it was aimed to reveal the motivations behind the idea of developing products and services in combating disasters of the Shelter Systems Company, and the organizational structure characteristics, mission and vision strategies of new product and service development activities were focused on. Strategic plans regarding product and service innovation, which set out the organizational goals they aim to achieve in order to fulfil their vision strategies and how they can be achieved, were questioned, and the goals and purposes behind the development of new products and services were examined [refer to Figure-3].

Culture is the set of norms, patterns, beliefs, and attitudes that guide the behaviour of employees. For the BPA, under the heading of *'culture'*, steps, and tasks within creative processes such as Design,

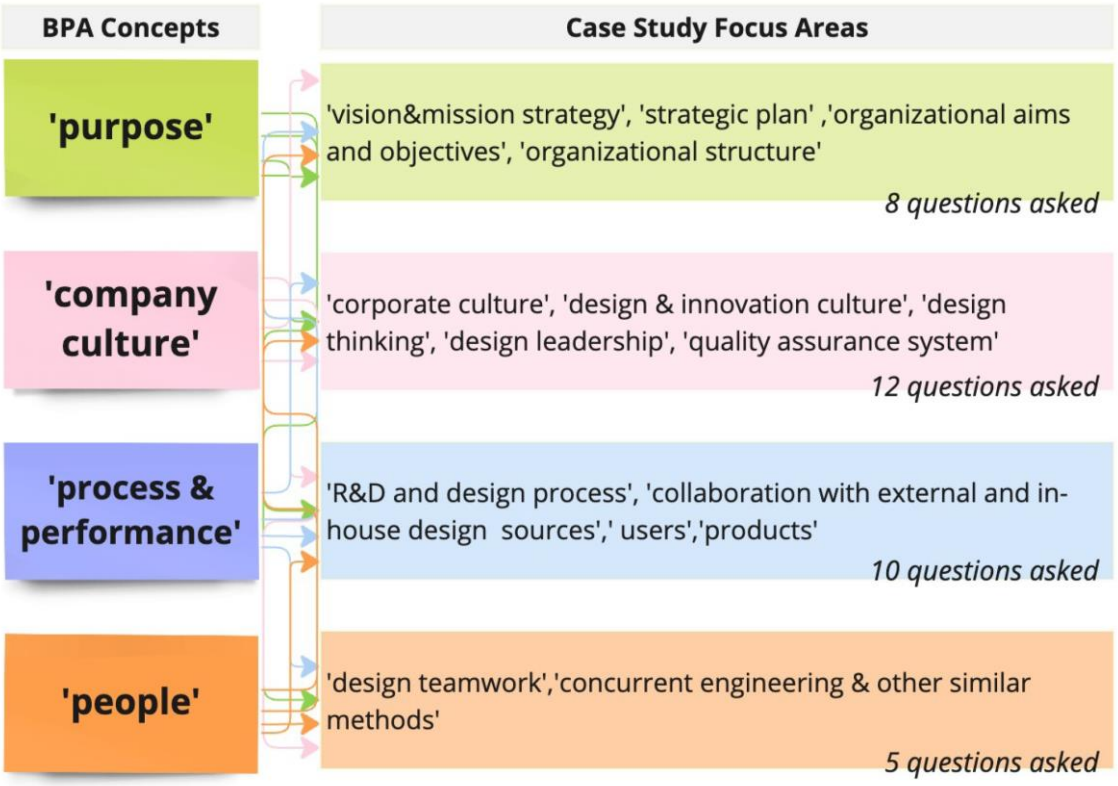

Figure-3. Diagrammatic representation of BPA concepts and case study focus areas

R&D were focused on in order to understand the ongoing functioning. How project activities and design processes are carried out for disaster response, how 'design thinking' is shaped within the corporate culture, and roles of design in innovation activities were focused on. The research examined the organizational structure and culture of cooperation for innovative activities such as design and R&D, and the quality assurance systems adopted for quality management.

'Under the heading *'process and performance',* the focus is on the stages of processes and performance of new product and service design processes in disaster management. Processes consist of logically interrelated tasks and steps to achieve the intended result. It is the sum of the steps in which production inputs are received and an output that will create value for the customer is created. Performance, on the other hand, defines the level of achievement of the purposes of the enterprise. According to Champy (1995), the key concept used in improving business processes through change engineering is process. Finally, for business process analysis, human resources involved in innovation processes were analysed. The driving force of innovation is human resources. To achieve change, knowledgeable people may be more important than the knowledge itself (Aktan, 2021). Since it is people who produce knowledge, the research focused on how human resources are utilised and supported for effective teamwork in innovative processes such as design and R&D in the Shelter Systems Company. In the following section, the findings from the case study will be discussed in order to present the current situation regarding the creative business processes carried out by the Shelter Systems Company**.**

3. Findings

3.1. Product design process in the shelter systems company

Turkish NGO is Türkiye's largest non-governmental organization in disaster management, meeting the needs of people after a disaster, especially in terms of nutrition and shelter, and delivering humanitarian aid to the field, as mentioned above. Turkish NGO affiliated Shelter Systems Company is the most important tent and textile manufacturer of Türkiye with its capacity to produce 360.000 disaster tents per year. The Company, which has significant experience and corporate culture in humanitarian aid, produces shelter systems for customers such as AFAD and the International Red Cross Federation. There is no industrial design department within the organizational structure of the Shelter Systems Company (Interview-1). The Company does not cooperate with independent design consultancy companies and does not carry out joint integrated product development process activities with supplier companies in disaster response. Its cooperation with industrial design schools to gain innovative product ideas is small-scale (Interview-1). For this reason, the roles played by industrial design in the process of obtaining the products and services are limited. On the other hand, there are R&D and Textile Design Departments, both employ a small number of specialists, within the organizational structure of the Shelter System Company, and they are represented in the Board of Directors of the Company in managerial terms. Tent design requests from clients are met by the R&D department, and workwear requests are met by the textile design department in the company (Interview-1).

In the Shelter Systems Company, tent designs and 3D-models/prototypes are made by engineers working in R&D. The starting point of the design process is the "*product brief* " received from the client (Interview-1). This document consists of data that will constitute the basis for the design, such as local conditions in the disaster area, climate, cultural differences, the number of people to be sheltered, and the type of service **(**Interview-1). Observations of the teams working in the field and feedback from disaster victim visits contribute to design ideas (Interview-1). The experiences, problems, desires and wishes of the disaster victims in shelter areas are used as reference sources in the design process. However, it has been determined that the Shelter Systems Company adopts a limited participatory design approach in the innovation process. The differences in the needs of the target group, which lead to product diversification in both disaster tents and equipment tents for providing social services, are not included in the product ranges. Due to the limited capacity of the design department, 'design thinking' within the company remains at the level of developing product models, in other words, design thinking is far from the idea of developing new social services. The innovation process in the company is a relatively closed process carried out to internalise user influences in the design process, especially for vulnerable groups. For example The emergency tents (designed for medical purposes) and general purpose tents (designed to be used as school, storage, working space, office, dormitory etc.) of the Shelter Systems Company provides spatial isolation and flexible space usage for the users. However, the in-space requirements are not addressed in these tents. For example, a school tent is designed without considering interior spatial arrangements such as heating, desks, and chalkboards. However, unless tent design and interior design are handled with a holistic design approach, it is not possible for the product service offered to be effective and to meet the needs in the field context properly. Developing integrated processes for innovative product and service targets, and supporting open knowledge sharing and collaborations can ensure that knowledge is transferable between organizations and provide the opportunity to learn both technology and field-related problems and requirements. According to new generation innovation models, learning across organizations, stakeholders and disciplines is important for innovative process achievements and horizontal collaborations such as joint ventures and research groups should be encouraged (Hobday, 2005; Ünsal, 2016).

In the innovation process approaches of the Shelter Systems Company, ecological sustainability and environmental issues come to the fore as a design approach in models such as "*Green Tent*" (Interview-1). It has been determined that all tent systems support the disaster logistics and reverse logistics systems. The tents collected after the disaster are maintained and repaired to extend their lifespan and put back into use (Interview-1). Therefore, it can be said that the circular design approach developed as an extension of circular economy is considered by the Shelter Systems Company in the shelter services provided in disaster management.

2.2. Industrial design for corporate and financial sustainability

The Turkish NGO defines its vision as ensuring that all people live humanely by providing resilience-building activities and humanitarian aid both in disasters and emergencies and in ordinary times. Its mission is stated as increasing individual and social resilience, especially in vulnerable individuals and communities, and carrying out solution-oriented activities wherever needed, while respecting the right of every human being to live in dignity **(**Turkish NGO Annual Report**,** 2023). In order to achieve this vision, the Turkish NGO has been restructured in 2018 by separating its two organizational functions. The first of these is the Turkish NGO responsible for carrying out humanitarian aid operations in the field after disasters, and the second is the Investment Company established to provide regular resources for the Turkish NGO's humanitarian aid activities. In the Strategy Plan Document of the Turkish NGO (2021), it is shared that NGOs should secure the necessary sources of income in order to sustain their mission in disasters, and their technical and administrative capacity should be developed in order to ensure sustainability (Interview-1). Therefore, the Investment Company aims to increase its service capabilities by generating more value through income-generating activities in line with its mission. In line with this goal, the Investment Company and its affiliated group companies engage in 'social impact investing', aiming to effectively utilise the resources entrusted to it and strengthen the financial sustainability of the Turkish NGO that carry out humanitarian aid activities with donations (Turkish NGO Strategic Plan, 2021). It generates income from the products and services produced by its Investment Subsidiary Companies and transfers its earnings to the Turkish NGO.

This structural transformation planned by the Turkish NGO is defined as 'social entrepreneurship'. Since the early 1990s, social entrepreneurship has been defined as a component of sustainable development (Apostolopoulos et al., 2018). Particularly from the perspective of NGOs, social enterprises that develop proactive and innovative business models have started to play important roles. Social enterprises adopting structures that generate economic activities, rather than reactive structures reliant on donations, can produce sustainable social benefits from the revenues generated by these activities (Akkuş, 2024; Interview-1). According to Interview-1, the increase in the frequency and destructive effects of disasters necessitates the development of new strategies and business models to respond to disasters, and social enterprises need business models that will make them financially sustainable to provide social benefits. Therefore, in order to support the vision of the Turkish NGO, the Shelter Systems Company declares its vision to design and produce top quality products, whose products are demanded and preferred by everyone, and thus to contribute to the Turkish NGO on a global scale. The mission of the Shelter Systems Company is to provide solutions in the fastest way possible by producing the products and projects needed by the Turkish NGO with the highest quality standards and an innovative perspective (Interview-1).

The Shelter Systems provides product services in line with the strategic plan targets set by the company for corporate and financial sustainability and manufactures for different market needs such as air ducted tents, gazebos, storage, event, and military tents in addition to disaster tents. In the field of the Shelter Systems, they produce for public institutions, municipalities and non-governmental organizations. The company also produces large and small livestock tents, greenhouse tents, camping tents for agricultural entrepreneurs; refugee and shelter tents for AFAD and NGOs abroad; work clothes, home type first aid box, umbrellas for hotels, restaurantsand campers for

disaster rescue teams. In addition to the sheltering needs of disaster victims, the Shelter Systems Company manufactures tents suitable for school, work area, living area, office, dining hall, dormitory, masjid, office, coordination etc.. When the product range is examined, it is seen that the products of the Shelter Systems Company exhibit diversity. The company produces 'emergency, temporary and permanent sheltering' units such as containers, light steel structures and permanent housing to meet the sheltering needs of post-disaster period (Interview-1).

The Company supports R&D and innovation investments with the savings gained from production, and carries out joint R&D projects with universities and research institutes in different fields (Interview-1). R&D activities are mainly developed on the axis of quality. For example, some of the products of the Shelter Systems Company are certified at the quality level with product features such as 'waterproofing', 'flame retardancy', 'durability', 'fast installation and dismantling' and have a national and international quality assurance system. The fact that the Turkish NGO is a member of the International Federation of the Red Cross can be considered as an indicator of product quality, as it is the main supplier of shelter systems in foreign countries.

In the Annual Report of the Investment Company (2021), it is stated that the Investment Company plans to take part in the tent and outdoor textile products market with a different new brand concept due to the growth of the outdoor market share worldwide. Currently, the Shelter Systems Company manufactures tent models for outdoor/camping activities and offers its products to consumers on online trading platforms. Thus, it aims to produce more sustainable solutions in humanitarian aid and gain resilience against disasters by orientating towards income-generating activities in line with its mission (Interview-1). It can be said that the design, which is consistent with the corporate and financial sustainability objectives of the Shelter Systems Company, contributes to this. However, although the design is functionally important, it has been determined that the design capacity is currently limited**.** If it is planned to create a new brand value for the competitive outdoor market in the future, it is necessary to adopt a combination of price and image-effective competitive strategy, to develop their design functions at both organizational and process levels, and to carry out design and market research processes that are open to cultural influences in order to develop desirable products in global markets.

For the innovation activities, the Shelter Systems Company carries out expert-oriented solution processes in design and R&D activities and is not open to multi-disciplinary interaction (Interview-1). However, information production and sharing based on interdisciplinary interaction and horizontal co-operation are seen as factors that increase the success of innovative product service development processes (Hobday, 2005; Ünsal, 2016). Today, it is accepted that information does not come from a single source. Interactive and creative business networks that encourage open information sharing should be supported, and design approaches that encourage collaborative culture, such as participatory design, support process success and the development of creative human resources.

How disaster response design is positioned and perceived by senior management within the company is related to the design culture experienced and accumulated within the organization. If the level of value added by design within the Shelter Systems Company is explained on the pyramid presented by Celaschi, et al. (2011), industrial design is seen as a tool for style/model development and is used as a necessity without any role in the company strategy. On the other hand, the fact that design becomes a valuable asset for the company and gains a place in the company hierarchy emerges in the advanced stages of design utilisation. The highest functional stage of design is the integration of "design and systems thinking" into management plans. The emergence and development process of design and design management subjects within the company develops over time by interacting with system components and turns into knowledge accumulation. In reality, it can be said that the use of design and design management discipline areas as a strategic tool is new for many companies in Turkey. In the following conclusion section, strategic recommendations for effective industrial design based on the findings of the case study will be discussed.

CONCLUSION

The Turkish NGO has been an important player in humanitarian aid, especially in disaster response. The Shelter Systems Company, while maintaining its original mission, has recently shifted to income-generating activities that support social entrepreneurship, aiming to transform these efforts into social benefits. The importance of social entrepreneurship in sustainable development is also recognised in the social enterprise and social innovation literature, where the issue of financial and corporate sustainability in disaster management is a goal adopted by the Turkish NGO. For this reason, it can be said that supporting social entrepreneurship, especially NGOs and social enterprises, with design services can contribute to gain resilience against disasters. In this sense, the added value created by design is an important tool that supports entrepreneurship.

Nevertheless, the shelter system company has restricted design activities necessary for delivering disaster-related products and services and for executing revenue-generating product operations. This study evaluated the company's innovation capacity based on the concepts of 'purpose,' 'company culture,' 'process & performance,' and 'people,' as derived from the Business Process Analysis [refer to Figure-3]. The BPA analysis indicates that the company lacks essential organizational structure elements required for the efficient utilization of design in disaster management. The main process activities of the Shelter Systems Company are primarily manufacture-orientated. It has limited industrial design capacity and its innovation process is closed to external influences. Additionally, its horizontal collaborations for open information sharing with external organizations and stakeholders are restricted. Consequently, the Shelter system company has not cultivated a corporate design culture. It has not adopted the design approaches outlined in the theoretical framework section that are necessary for effective disaster response. The company demonstrates significant shortcomings in adapting to local conditions during disasters, adhering to circular design principles, addressing the evolving needs of vulnerable populations and other stakeholders, and fostering collaborative networks in the innovation process. Instead, the Shelter system company focuses its design efforts on supporting production functions, while maintaining inadequate communication with disaster sites to generate innovative solutions.

Conversely, the BPA analysis revealed that the role of design is also limited in the Turkish NGO's income-generating activities aimed at fostering social entrepreneurship to enhance resilience in disaster response. The company's strategic plan objectives do not align with meeting the product and service demands of the highly competitive outdoor market. The company's design culture for revenue-generating initiatives shows weak characteristics, and collaborations with internal and external organizations to support the necessary innovation for product development are minimal. The 'process & performance' findings from the BPA indicate that product development follows a linear and sequential process, without integrating broader product development activities. Under the 'people' category, it was found that the company employs a limited number of creative individuals, who work closely with the production function and lack a multidisciplinary and interdisciplinary approach to product development. Based on these findings, this research proposes strategies that can be implemented in the short, medium, and long term in order to make industrial design more effective in the innovative process activities of the Shelter Systems Company in disaster managements.

For the strategy to be implemented in the short term, it is recommended that the Shelter Systems Company develops ongoing collaborations with industrial design schools. Collaborations will contribute to gaining innovative product ideas and will create the opportunity to discover designers that can be employed within its own organization in the future. In this period, developing and supporting collaborations with researchers within the scope of post graduate programmes will contribute to gaining strength from academic research. It is also recommended to organize

competitions to develop project portfolios of the Turkish NGO and institutions such as AFAD and local governments in combating disasters, and to establish e-platforms where project and research findings are shared for open knowledge sharing. Sharing the acquired knowledge as open information in digital media can be used as an instrument to integrate the stakeholders in the disaster response ecosystem and to encourage their cooperation in innovation processes.

The medium-term strategy suggests the further development of design culture within the Shelter Systems Company. According to this strategy, the company should improve its limited design staff and employ more designers. In this period, it is recommended to support collaborations with independent design consultancy companies in order to develop design culture, to receive training consultancy not only for gaining innovative ideas but also for different speciality areas of design, and to support collaborations on a national and global scale. This period can be planned to be the period in which organizational capacity such as design, engineering and market research supporting innovative process activities, in which income-generating commercial product services begin to mature, and in which brands supported by new concepts are introduced to the market under the umbrella brand of the Turkish NGO.

In the strategy to be implemented in the long term, with the development of design culture, design becomes a valuable asset for the company and design is recognised as a separate business line in the company hierarchy. It is the period when "design and system thinking", in which design provides the highest functional added value, is integrated into management and business plans and design culture. This period can be seen as one where the continuous development of quality excellence principles in design is adopted as a strategic target. It focuses on seeking innovative service solutions tailored to human needs, local conditions, and disaster types. This approach is guided by continuous research aimed at addressing future threats and uncertainties in disaster response and is supported by collaborations.

In this period, it is suggested to develop a 'Design Company' or 'Design Centre for Disaster Response' as a subsidiary company within the Investment Company, with the potential contribution of design to practice. These new structures can be considered as a connection centre that develops horizontal collaborations and inter-institutional connection capabilities in interdisciplinary and sub-branch departments.

In Türkiye, innovative product and service development decisions for disaster preparedness exhibit centralised characteristics. Therefore, there may be a tendency to search for universal solutions in innovative product solutions. However, taking cultural and local sensitivities into consideration in design processes and using local capacity as a source of information, opening 'Regional Design Centre(s)' in order to get closer to regional cultural influences can contribute to getting closer to external cultural influences specific to the locality. While the Design Centre focuses on global and national design strategies, regional design centres can be considered as solution partners that contribute to producing strategies and policies in place and in context by focusing on local impacts. The 'Design Centre' can establish itself as a design service provider within the disaster response ecosystem, serving not only internal clients within the Turkish NGO but also external clients involved in disaster relief efforts.

As a result, the capital of development in organizations seeking innovation is people. The question of what skills are to be acquired in the human capital to be developed in order to improve human resources in disaster management is the important question that will actually trigger change. It can be said that it is important for organizations to demand change in order for change to occur.

Compliance with Ethical Standard

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GENİŞLETİLMİŞ ÖZET

Çalışmanın Amacı:

Hızlı kentleşme, iklim değişikliği, doğal kaynakların tüketimi, ekosistemlerdeki bozulma ve küresel salgın faktörleri son yıllarda tüm dünyada doğal afetlerin sosyal ve mekânsal sonuçlarını derinleştirmiştir. BM Üçüncü Dünya Konferansı'nda kabul edilen Sendai Afet Riskini Azaltma Çerçevesi 'ne göre afetler, etkin bir şekilde yönetilmediği takdirde farklı sosyal ve ekolojik krizleri tetikleyebilen, kaos düzeyi yüksek vakalardır. Afetlerin yarattığı kaos ortamlarını yönetilebilir kılmak için merkezi ve yerel yönetimler başta olmak üzere tüm toplumsal kesimlerin afetlere müdahalede eşgüdümlü, hızlı aksiyon alması gerekmektedir. Araştırma, sürdürülebilir afet yönetimi için ürün sistemlerinin geliştirilmesinde endüstriyel tasarımının rolünü tartışmakta ve afetlere müdahalede fiiliyatta etkili ürün hizmet çözümleri geliştirmek için endüstriyel tasarım perspektifinden stratejiler geliştirmeyi amaçlamaktadır.

Araştırma Soruları:

Makale, sürdürülebilir ve afet yönetim sistemi içinde yeni ürünler geliştirmek için endüstriyel tasarımının sağladığı katkıları sorgulamaktadır. Araştırma için benimsenmiş araştırma soruları şu şekilde ifade edilebilir. Barınma Sitemleri **BS** Şirketinin afetlere müdahalede benimsediği tasarım yaklaşımları ve endüstriyel tasarımının üstlendiği roller nelerdir? Şirketin afet yönetim evreleri içinde endüstriyel tasarımının sağladığı ürün ve hizmet alanları nelerdir? BS Şirketinin tasarım, Ar-Ge gibi yenilik süreç faaliyetleri için benimsemiş olduğu organizasyonel yapı özelikleri nelerdir?

Literatür Araştırması:

Son yıllarda afetlerin sıklığının ve yarattığı yıkıcı etkilerin artması, endüstriyel tasarım yazınının dikkatini afetler konusuna yöneltmiştir. İlgili literatür 1970'li yıllardan itibaren dezavantajlı grupların ihtiyaçları ve çevresel sorunlar gibi doğal ve toplumsal sorunlara odaklanmış, ancak bu yaklaşım içinde endüstriyel tasarımın afet yönetimindeki rolü daha az tartışılmıştır. Afetlere dayanıklı toplum geliştirmek, endüstriyel tasarım disiplini için niş alandır (Papanek,1973; Huang & Anderson, 2011; Noh vd., 2014; Avendano vd., 2017; Triatmodjo, 2021; Ünsal 2024). Dünya Tasarım Örgütü, doğal afetlerin sıklığı ve etkisi arttıkça, toplumların ve şehirlerin gelecekteki insani krizlere yanıt vermesine yardımcı olmada 'tasarımın' kritik rol oynayabileceğine dikkat çekmiş, dolayısıyla afet yönetim döngüsü içinde yer alan ‘önleme’, ‘hazırlık’,’ acil müdahale’ ve sosyal yaşamı ‘normalleştirmesine’ yönelik bu dört evrede diğer disiplinlerle birlikte tasarımın daha güvenli ve dayanıklı gelecek inşa etmedeki önemini vurgulamıştır.

Tasarım yazını, afet yönetimi evreleri içinde sağlayacağı katkıların yanı sıra yenilik sürecinde benimsenmesi gereken ilke ve yöntemsel yaklaşımları da tartışmaktadır. Afetler için geliştirilecek ürün sistemlerinde yerel özelliklere ve kapasitelere duyarlı olunması, lojistik faktörlerin hesaba katılması, çevre dostu stratejilerin benimsenmesi, kurumsal ve finansal sürdürülebilirlik, disiplinler ve paydaşlar arası iş birliklerinin desteklenmesi gerektiği vurgulanmaktadır. Kültürel deneyimler, çevresel ve sosyal sürdürülebilirlik, eko tasarım, sosyal tasarım ve inovasyon, döngüsel tasarım, gibi kuramsal ve yöntemsel tartışmalar, toplumun afetlere karşı toplumsal dayanıklılığını artırmak için önemli açılımlar sağlamaktadır. Yereldeki kültürel ve çevresel farklılıklar dolayısıyla afet sahasındaki farklılaşmalara neden olmakta, özelikle de cinsiyet, kadın, çocuk, yaşlı, engelli gibi kırılgan grupların ihtiyaçları ürün sistemlerinden beklentileri farklılaştırmaktadır. Ayrıca afet ve tasarım yazınında, ürün sistemlerinde dayanıklılık, yeniden kullanım, esneklik, bakım, montaj, lojistik ilkelerinin desteklemesi ve mevcut kaynakların kullanımını üst düzeye çıkarılması, sistemlerin fiyat etkili geliştirilmesi, kullanım sonrası toplama ve dönüştürme esaslarının göz önünde bulundurulması, atık oluşumunun önlenmesi ve ekonomiye kazandırılması benimsenmesi gereken ilkeler arasındadır.

Öte yandan, insani yardım hizmetlerinde önemli rol üstlenen STK'lar için finansal ve kurumsal sürdürülebilirlik konusu sosyal işletme ve sosyal girişimciliğin sağlayabileceği katkılar sürdürülebilirlik ilkeleri üzerinden tartışılmakta tasarım düşüncesinin sistem düşüncesinden bağımsız olarak ele alınmaması gerektiği savunulmaktadır. Afetlere müdahaleye yönelik hizmetler geliştirilmesi için, afet yönetiminde yer alan aktörlerin afet yönetiminin her aşamasında çoklu ve disiplinler arası iş birliğine ve açık bilgi paylaşımına yönelmeleri, yenilikçi iş-ağlarının geliştirilmesi gerektiği inovasyon modellerinde de tartışılmaktadır. Gerçekte tüm bu yöntemsel yaklaşımlar, birbirinin alternatifi olmayıp birbiriyle uyumlu çalışabilecek tasarımda sistem düşüncesini destekleyen yaklaşımlardır. Araştırma için gerçekleştirilen vaka çalışması kapsamında, Türk STK'na hizmet veren BS Şirketi'nin tasarım ve Ar-Ge gibi süreç faaliyetlerinin organizasyonel yapı özelliklerine ve endüstriyel tasarım disiplininin üstlendiği rollere odaklanılmıştır.

Yöntem:

Vaka çalışması kapsamında, afet sonrası sosyal hayatın normalleşmesi için hizmet veren BS Şirketi'nin tasarım ve Ar-Ge gibi yenilik süreçlerine odaklanmak amacıyla nitel araştırma yöntemi benimsenmiştir. Türk STK'na hizmet veren BS Şirketi'nden veri toplamak amacıyla (i) tasarım süreci faaliyetlerinde görev almış iş süreçlerine hâkim çalışanıyla görüşmeler, (ii) faaliyet raporları, stratejik plan belgeleri, ürün katalogları gibi kurumsal kaynaklar üzerinden belge araştırması yapılmıştır.

BS şirketinin seçiminde tasarım ve Ar-Ge gibi yaratıcı süreç faaliyetlerine organizasyon yapısı içinde yer vermesi, küresel ve ulusal düzeyde insani yardım hizmetleri yürüten daha birçok uluslararası STK, kamu kurum ve kuruluşunun üreticisi olması belirleyici olmuştur. Tasarım süreçlerine ilişkin sorgulamaların yapılabilmesi amacıyla yarı yapılandırılmış soru tekniği hazırlanmış görüşmeler gerçekleştirilmiştir. BS Şirketi'nin yaratıcı süreç faaliyetlerinde tasarımın rolünü ve tasarım süreçlerinin doğal iş akışını anlamak ve yaratıcı süreç faaliyetlerinin ayrıntılı bir resmini oluşturmak için iş süreçleri analizi **İSA** yapılmıştır. İSA, yenilik süreç faaliyetlerinde girdilerin çıktılara dönüştürülmesinde iş süreçlerinin 'nasıl ve ne şekilde' ele alındığını detaylı bir şekilde tanımlamak için kullanılan yöntemidir. Esasen iyi uygulama araçlarını geliştirmeyi amaçlayan İSA, mevcut yenilikçi süreç faaliyetlerinin performansını iyileştirmek ve iş süreci tasarım çıktılarını denetlemek ve gözden geçirmek için kullanılmaktadır. İSA, üretim süreçlerinde aksamalara neden olan faktörlerin tespit edilmesini ve süreçlerin yeniden geliştirilmesini amaçlar. Örnek olay kapsamında, endüstriyel tasarımın ürün geliştirme sürecindeki rolünü ve mevcut durumu tanımlamak amacıyla Champy (1995) tarafından İSA için belirlenmiş 'amaç', 'kültür', 'süreç ve performans' ve 'insan' kaynakları konu başlıkları altında 32 soru, hazırlanmıştır.

Sonuç ve Değerlendirme:

Araştırma sonucunda BS Şirketi'nin afetlere müdahalede benimsemesi beklenilen 'afetzede odaklılık', döngüsel tasarım, ekolojik tasarıma ilişkin tasarım ilke ve yöntemsel yaklaşımların ürün geliştirme süreçlerinde zayıf düzeyde uygulandığı, tasarım ve yenilikçiliği destekleyen yaratıcı ve araştırıcı iş-ağlarının sınırlı düzeyde kullanıldığı tespit edilmiştir. Afet sonrası sosyal yaşamı normalleştirmeye yönelik sunulan acil ve geçici barınma hizmetlerinin toptancı bakış açısıyla çözüldüğü, yereldeki sorunlara odaklanan bağlamsal ekolojik ve sosyolojik farklılaşmaların, kırılgan grupların hesaba katılmadığı, ürün çözümlerinin sistem düşüncesinden ve sahadaki gereksinimleri karşılamaktan uzak olduğu bulunmuştur.

Şirketin ana faaliyetleri öncelikle üretim odaklıdır. Sınırlı tasarım kapasitesine sahip BS Şirketi'nde 'tasarım kültürünün' gelişmemiş olduğu, 'süreç ve performans' çıktılarının zayıf çıktılar sergilediği belirlenmiştir. Ayrıca inovasyon faaliyetlerinde dış etkilere kapalı süreçler gerçekleştirildiği, dış kuruluşlar ve paydaşlarla açık bilgi paylaşımına yönelik yatayda kısıtlı iş birlikleri gerçekleştirildiği tespit edilmiştir. BS Şirketi'nin yaratıcı süreç faaliyetlerinde tasarımın rolünü ve tasarım süreçlerinin iş akışını anlamak için gerçekleştirilen İSA sonucunda, işletmenin son dönemde sosyal girişimciliği destekleyen gelir getirici faaliyetlere yöneldiğini ve bu çabaları toplumsal faydaya dönüştürmeyi hedeflediğini ortaya koymuştur. Ancak BS Şirketinin, sosyal girişimcilik yoluyla yatırım kapasitesini artırmak için tasarımın işlevsel kullanımını ve insan kaynaklarını geliştirmesi gerekmektedir. Bu bağlamda makalenin sonunda BS Şirketinin sürdürülebilir afet yönetiminde etkili endüstriyel tasarım yapabilmesi amacıyla kısa, orta ve uzun dönemde uygulanabilecek stratejiler geliştirilmiştir.