A socio-technical approach to design for community resilience: A framework for analysis and design goal forming

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This paper presents a finding on the application of socio-technical systems design to analyse community resilience and develop design goals to enhance it. It describes a framework for diagnosing the resilience of people's social networks and developing strategies based on network theory. It goes on to outline the methodology and findings of a case study exploring the application of this framework in analysing producers' collaborative networks around a farmers' market in Milan. Based on the analysis, the paper explores the perceived feasibility of this framework as a preliminary stage to develop collaborative services. It concludes by commenting on the wider implications of the framework to design for sustainable services.
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In the recent years, resilience has gained attention due to increasingly complex and frequent natural and man-made disasters. Resilience, originally known as the capacity of a system to retain its identity after a disturbance in ecology (Holling, 1973), is the ability of man-made and natural systems to cope with external shocks. These systems can be individuals, communities, society, nature, or a mix of them. Resilience is therefore a traversal topic across multiple disciplines such as ecology, psychology, public policy, and complex systems studies. This study focuses on the resilience of communities, which has been mainly addressed in social-ecological systems studies and public policy. We have thus adopted the definition of resilience widely accepted in these fields: the capacity of a system to absorb disturbance, undergo change, and retain the same essential functions, structure, identity, and feedbacks (Resilience Alliance, 2010). Resilience is an essential characteristic of a sustainable society since sustainability, in its definition of improving the quality of human life without compromising the needs of future generations, implies the capacity of a system to persist in time (Costanza & Patten, 1995).

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Resilience is related to the relationships within a system and their structure (Holling, 1973), and to design for it requires a systems approach. Positing that people are a component of communities, community resilience depends on, but is not limited to, their social relationships and relational structure. An approach to design for resilience is then to support people to construct social relations in the direction favourable to resilience through technical interventions. These interventions could include development of services that, using resources in communities, create new social and operational values for them (Manzini, 2009). We thus propose a socio-technical system (STS) approach to design for resilience. Under this approach, communities are considered as a socio-technical system, and the resilience of their social system is enhanced through the design of the technical system. In STS studies, a human organisation is seen as an integration of two heterogeneous but mutually causative and supportive systems: a social system in which the members spontaneously create and enrich relationships through activities, and a technical system where they carry out sets of tasks related to specific goals (Trist, 1981).[1] These systems are interdependent, and their optimised integration leads to higher productivity and wellbeing of an organisation. As a socio-technical system, a community comprises people and their relationships, and communal activities that transform various resources into desired values. For designers to be able to approach resilience with interventions in the technical system, a framework is necessary that explicates the interaction between the two systems, approaches resilience as an operational concept, i.e., a concrete and measurable system potential, and supports the design of the technical system based on understanding of the social one.

Although community resilience is a relatively new subject in design research, studies directly or indirectly contributing to social and ecological resilience have been conducted, particularly in the area of design for sustainability. Topics include the cultures of resilience (Manzini, 2014), design for relations and relational qualities (Cipolla & Manzini, 2009; Snelders, Garde-Perik, & Secomandi, 2014), design and social-ecological diversity (Cantu, 2012; Meroni, 2008), user empowerment (Ehn, 2008; Kimbell, 2011), and mutual benefits among stakeholders of product-service systems (Burger, Ganz, Pezzotta, Rapaccini, & Saccani, 2011; van Halen, Vezzoli, & Wimmer, 2005). In general, however, resilience is rarely addressed in design literature, and if it is, it is used as a metaphoric[2] or abstract term to be desired rather than an operational one that can be measured and assessed. Efforts to expand design knowledge on resilience and improve its rigour are thus needed. Motivated by these limitations, we ask the following question: How do we diagnose problems related to resilience of the social system in a community? To address this question, we developed a framework to analyse and initiate design interventions for community resilience, and conducted empirical research for validation.