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Simonse, LWL

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Social foresights on Covid-19 futures: developing a NLP tool for Strategic Design Research

LIANNE SIMONSE, Delft University of Technology – Industrial Design Engineering faculty – department of Design, Organization Strategy.

1. INTRODUCTION

Future sense-making is the social activity by which people give meaning to their collective experiences in crisis situations (Weick, 1988) such as the outbreak of Covid-19. Enacted in conversations and narratives, sense-making is a largely cognitive activity of framing experienced situations as meaningful (Maitlis & Christianson, 2014; Stigliani & Ravasi, 2012). It is a collaborative process of creating shared awareness and strategic understanding about the future out of different individuals' perspectives and varied interests (MacKay, Chia & Nair, 2020). If and how such social sense-making about the future translates to social communities lies within the interest of this research from a strategic design perspective (Micheli, Perks & Beverland, 2018; Manzini, & Vezzoli, 2003).

Within the organization development literature many frameworks on future-sense-making have been developed. These include the influential conceptualization of foresight as coping with the future (Tsoukas and Sheppard, 2004) and the co-evolution between macroscopic foresight and microscopic actions of foreseeing when the present unfolds (e Cunha, Clegg, & Kamoche, 2012; e Cunha, Palma & da Costa, 2006; Chia, 2004). Within the design literature the development of theoretical frameworks have been concentrated on the articulation and elaboration of cognitive sense-making with material practices (Stigliani & Ravasi, 2012), the support of boundary object in future making with a course of action (Comi & Whyte, 2018), and to imagine future fictions as a means of exploring today's grand societal challenges and tomorrow's options (Bina, Mateus, Pereira, Caffa, 2017). However, despite all this gained insights and contributions into theoretical frameworks, the application of future sense-making, into useful tooling for strategic design practice has received less attention, and even to a lesser extend into relation with AI.

The purpose of this research is to analyze social foresights in collective sense-making about covid-19 futures. The research will be used to inform (new) strategies of innovation and better inform response efforts of organizations. The first stage is to build the theoretical framework that informs the NLP tool for the design research on social foresights.

In this paper, we show how to develop a NLP tool for strategic design research through conceptualizing a theoretical model how to analyze social foresights in collectively coping with the covid-19 outbreak.

1.1 Building the theoretical framework for Social foresight

Grounded on a critical selection of studies that conceptualized aspects of foresights, we constructed a theoretical framework from two dimensions: Social expression (S) and Foresight approach (F) and structured it into a circular order. The model conceptualizes social foresight distribution in a two-dimensional circular space, containing social expression and future foresight dimensions. Social expression represents the horizontal axis (Social optimism/pessimism) and approaches of future foresight (Imaginary/Predictive sense-making) represents the vertical axis, while the space in between reflects a particular blend of social expression and foresight expectancy. An emotional blend of shared anxiety/relaxation and an instrumental blend of envisioned (desired/despaired) future.

As Figure 1 shows, the circle is typically segmented into eight octants: +F = Imaginary sense-making; +F+S = Desired Future; +S = Social optimism; +S-F = Shared relaxation; -F = Predictive sense-making; -S-F = Despaired Future; -S= Social pessimism; -S+F= Shared anxiety. The center of the circle represents a neutral level of expression or foresight or both of these factors.

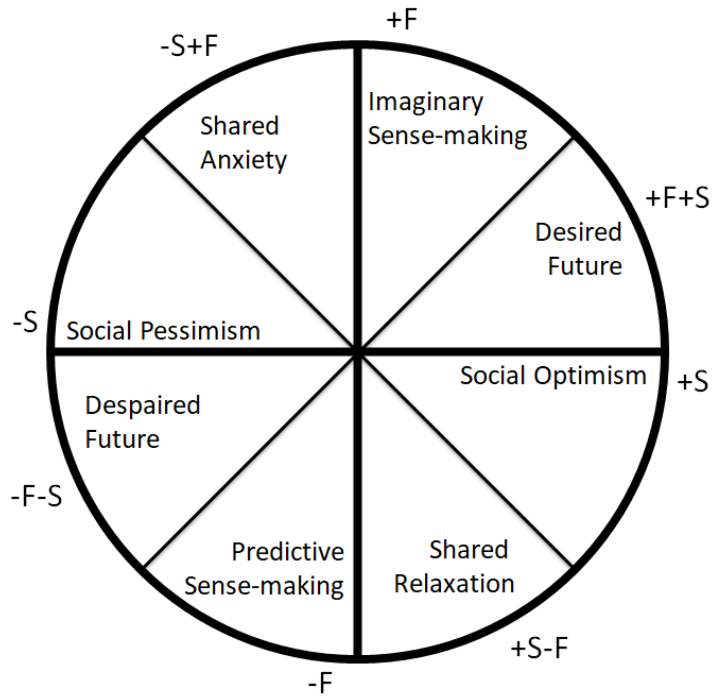


Figure 1: Circumplex model of Social Foresight

1.2 Developing the NLP tool for Strategic Design Research

We developed a new machine learning technique based on the model to capture a multi-dimensional representation of explanatory styles about the future (Bird, Bird & Loper, 2016). These 8 foresight explanations specified in the foresight model were incorporated as the dimensions in the proposed computational model.

We used a semi-supervised deep learning approach using word-embedding (Mikolov, 2013). Developing such a word-embedding using online community discussions enables to capture terms used by the community users that are semantically similar to the seed emotional terms. The analytic framework functions in several stages to transform the community discussions from unstructured text discussions in the everyday language into multi-granular, multidimensional information individualized by the user to analyze and aggregate ‘real life’ user reported outcomes (De Silva, Ranasinghe,..& Bolton, 2018). For each day the social foresight timeline was automatically generated on the captured social optimism/pessimism dimension from the expressed text and captured expressions. In the first stage of the research we trained our machine learning tool for the social communities with the social foresight circumplex model categorizations. In the second stage this research will investigate a sample of online communities from December 2019 – when the outbreak started - until December 2021 - two year later.



The development work in this stage suggests that there is a necessity of some manner of theoretical coupling among the social foresight elements involved in perceiving Covid-19 futures that goes beyond a rudimentary sentiment analysis and represents collective sense-making about covid-19 futures to better inform response efforts of organizations and new strategies.

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