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## **Seeking Novelty through Network Analysis of Digital Consumer Creativity**

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### Abstract

The value and potential of consumer contributions to product development are widely acknowledged, but it has remained difficult for companies to balance these with established foci in product development and concept design. In our on-going research, we attempt to develop network based methodologies to extract meanings from consumers' interpretations of a mundane technology – the elevator. Consumer creativity comes forth in that consumers' interpretations relate to quite different matters than the examined product and its features. We use data from the social media platform Instagram to recognize hashtag networks that revolve around lifestyles of young males, expressions of places, as well as cultural activities, public transport and gratitude. Rethinking material products through affects attributed by consumers further offers new kinds of opportunities to develop sustainable innovations.

## 1 Introduction

Why do companies keep struggling with consumer creativity even when there is so much consumer generated knowledge to access and review? We argue that companies would do well by focusing on media created by consumers, which is independent from business activities, and make sense of how consumers interpret observations in their everyday lives. In this paper, we demonstrate how network analysis of social media data could to its part help examining consumer perspectives. We perform analysis on the mundane technology of an elevator and contrast our findings with how renewal is usually considered in the models of the business (Doz and Kosonen, 2010; Schallmo et al., 2017).

Consumers have indeed been acknowledged an important source of innovation (von Hippel, 2005), but it remains difficult for companies to embrace consumer creativity in a large scale even though consumers have become more approachable than before on digital platforms. Further, while companies increasingly rely on consumer-generated perspectives, they may value different types of ideas than those, which are developed by consumers (Hofstetter et al., 2017). In the field of sustainability, which is in our future research interests, consumer contributions to innovation in general have been questioned (Nielsen, 2020).

It would seem a valid strategy to distinguish consumer creativity from its contribution for companies, but established analytical tools to achieve this are underdeveloped and large-scale digital data can also be hard to obtain. Our work represents research in progress and in this paper our key aim is to develop and pilot a network methodology for extracting consumer creativity, which in latter research stages is to be applied in companies' concept and product development.

## 2 Extracting consumer creativity

The seminal work on the democratization of innovation by Eric von Hippel (2005) argues that users of products and services (i.e. individual consumers as well as firms) are increasingly creative in that they are

able to innovate themselves. The approach accounts best for knowledgeable and skilful lead users who experience problems with current market offerings. A major strength and accompanying limitation of this approach is its focus on new product development. This strand of research has progressed in assessing the relevance and prevalence across a wide range of industries.

Acknowledgment of the democratization of innovation is a particularly significant observation when combined with the idea of novelty seeking as a source of renewal in the consumer society (Campbell, 2018). When more sustainable products and services are targeted, it would appear important to account for consumer innovation as well as to consider that consumers are attracted to something that they have not experienced before even if anticipated novelty may disappoint them. Indeed, companies embracing the collaborative aspects of consumption in their innovation activities should consider social and novelty-seeking elements in consumption (Małecka et al., 2022).

There is accordingly demand for conceptualizations as well as methodologies and approaches to account for the many forms of consumer creativity in innovation activities. For instance, it has been recognized that creating environments in which consumers can have active dialogue and co-construct personalized experiences is quite different from seeing consumers as co-designers in companies' innovation processes (Prahalad & Ramaswamy, 2004; Roberts et al., 2021).

We explore how consumer creativity can be translated to insightful knowledge that can be found useful in companies' innovation processes. In our research, we apply network methodologies on interpretive data published by consumers in social media. Focus is on a very mundane urban technology with a long lifespan – the elevator – and the ultimate research task is to identify how elevators could be renewed in sustainable ways that provide novelty for consumers without needing to replace complete existing elevator systems with new ones.

This research is progressing and at this stage we are developing and piloting an approach for collecting examples of consumer creativity, applying network analysis and making early efforts to attribute meanings to acquired findings.

### 3 Data and network methodology

In the study we develop advanced network and script based methodologies for examining consumer interpretations of novelty. The examination of consumer coded interpretations (i.e. hashtags) shows how the idea of and experiences from an elevator can be reinterpreted as novelty through self-expression, luxury, arts, fun and intimacy. Consumers creatively interpret and encode their elevator experiences with hashtags.

We rely on network analysis to examine consumer interpretations through the networks of hashtags that consumers attribute to their ideas and experiences. Our ambition level of is to achieve a tested proof-of-concept, which can subsequently be used in an innovation project focusing on refreshing sustainable urban life.

Posts collected from the popular photo sharing platform Instagram are used as pilot data. Instagram is an interesting social media platform from the perspective of consumer creativity as each post is an artwork as it includes a photo or video, which is usually accompanied by an unstructured text and often coded with hashtags in order to attract viewers. It is a large platform with an average of 95 million daily uploads (Stout, 2022) and popular in particular amongst young adults (Smith and Anderson, 2018). Main motivations for using Instagram are self-documentation, social interaction, entertainment, passing time, and convenience (Alhabash and Ma, 2017), and hashtags are then used in ways which go beyond categorisations of posts (Eda et al., 2009).

We searched posts with the string 'hissi' (elevator in Finnish) from November 2017 to December 2021, and selected those which included the 'hissi' hashtag and any other hashtag. We then calculated co-occurrences of hashtags in the 179 examined posts. Examples of popular co-occurrences

included selfie - hissi (49 co-occurrences), finnishboy - hissi (26), helsinki - finland (12) and hissi - peilselfie (mirror selfie, 10.)

The Gephi network software (Bastian et al. 2009) is used in both data analysis and the visualisation of the co-occurrences of hashtags. Degrees of connection are expressed as node sizes and edge widths with larger and wider representing greater degrees. A modularity algorithm is applied to distinguish clusters consisting of closely related nodes (Blondel et al., 2008; Lambiotte et al., 2009), and these clusters are presented in different colours. The data visualisation of the network relies on the Fruchterman-Reingold layout, which simulates the graph as a system of mass particles with algorithms trying to minimize the energy of the physical system (Fruchterman-Reingold, 1991).

#### 4 Findings

Network analysis of even a small data set shows that it is conceivable to extract and analyse meanings, which consumers attribute to mundane technologies such as an elevator. The upcoming sections present early analyses of the findings to show the types of insights, which companies may find useful when attempting to rethink or recontextualise their offerings.

The network demonstrated in Figure 1 is based on all co-occurring hashtags in the examined Instagram posts. In this procedure, pairs of hashtags were identified in each post, and the connections of these pairs were then used to form the network. Figure 1 shows that the search string 'hissi' (elevator) is central to the network and its meaning cluster (in the brown colour) revolves around young males and their lifestyles with hashtags such as 'selfie', 'finnishboy', 'single', 'gymlife', 'inkedman', 'summer', 'viikonloppu' (weekend). Although this is the most generic meaning cluster in the data, it shows evidence of consumer creativity in the sense that the elevator is seen as something quite different from a technology for merely moving between floors in buildings. Instead, the elevator represents place and time for representing oneself and giving impressions to others (Belk, 2014).

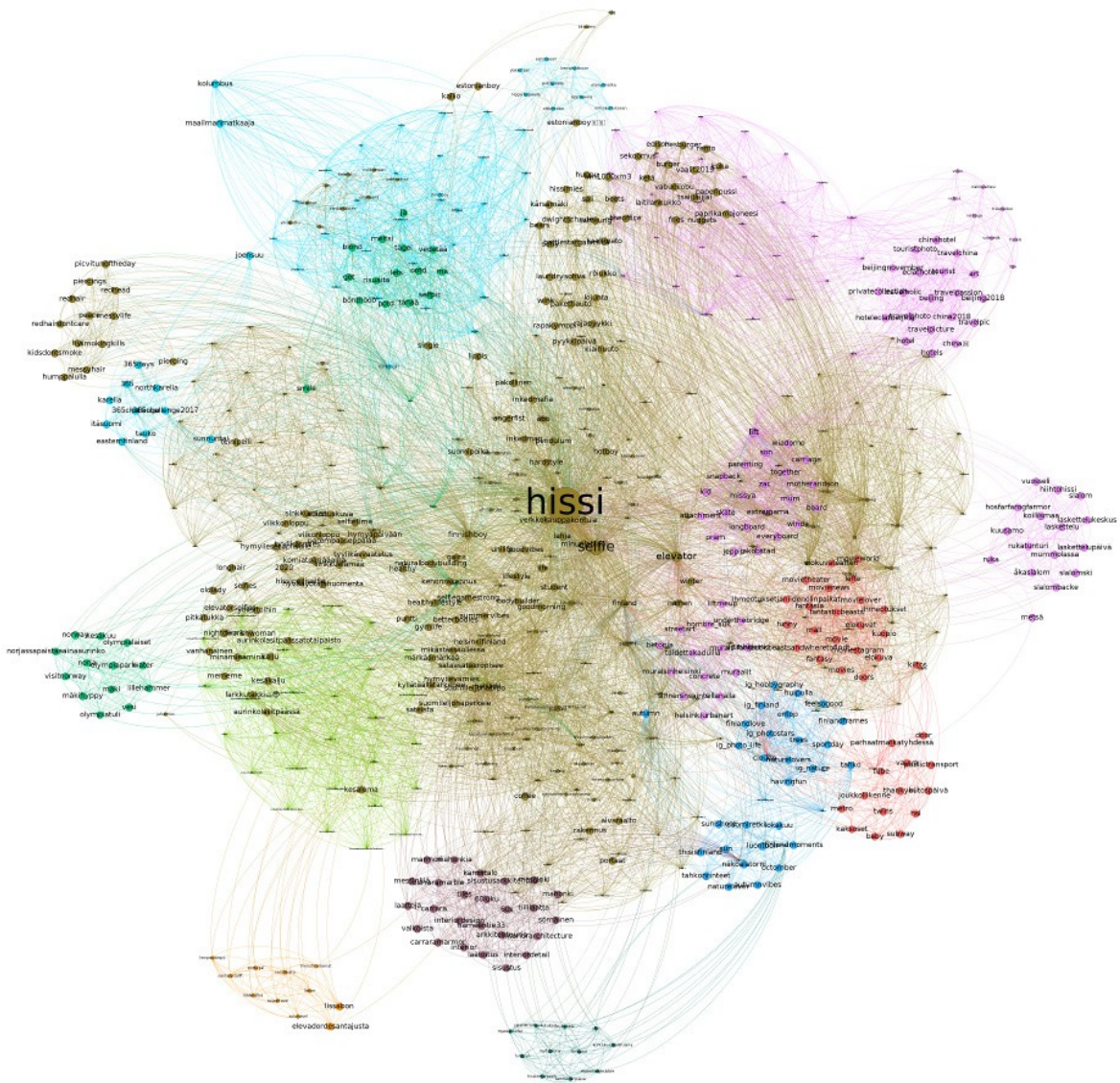


Figure 1 Clustered network around the search string 'hissi' (elevator).

A more distinct meaning cluster expressing place is presented in Figure 2 (in the purple colour). Urban street art in Helsinki, traveling to China and experiences connecting to ski lifts and close ones contribute to non-technical meanings for elevators. Places are in this way integrated to one's social and cultural life while also being interpreted to communicate meanings (O'Toole and Were, 2008).



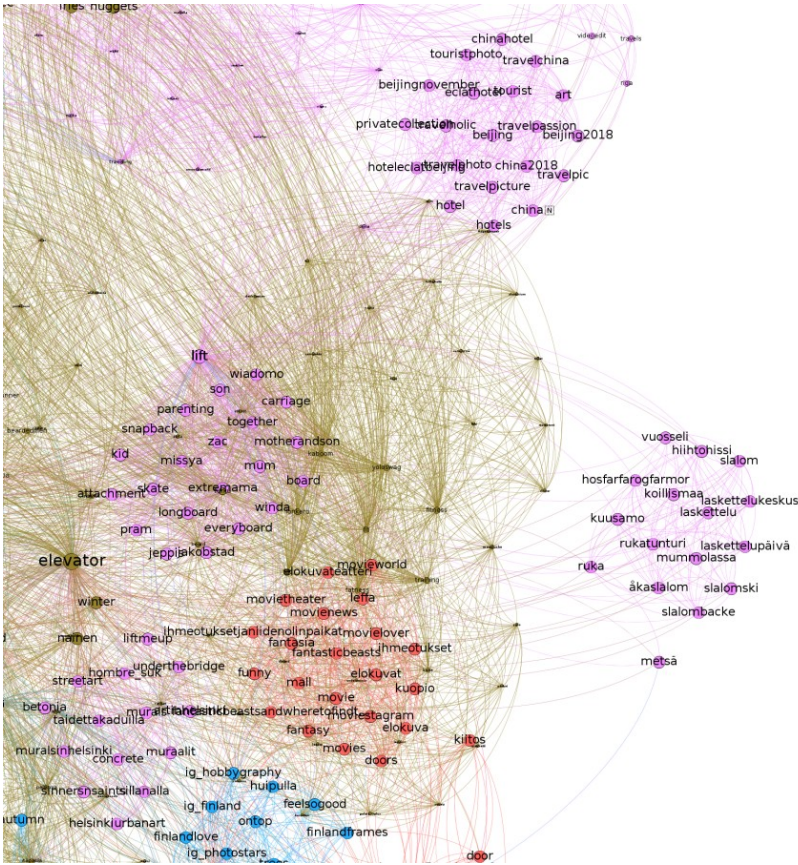


Figure 2 Example of connections expressing places (in purple).

A closer look at some clusters may also reveal connections to more detailed activities. Figure 3 shows a cluster (in the red colour) that expresses cultural activities ('movies', 'movielover' and 'moviestagram') and public urban transport ('metro', 'subway', 'publictransport'). Gratitude connects the two thematics ('kiitos' i.e. thank you), indicating that shared experiences are thanked for in the postings, thereby performing affects of intimacy, which reach beyond categorizations through the use of hashtags (Brett and Maslen, 2021).



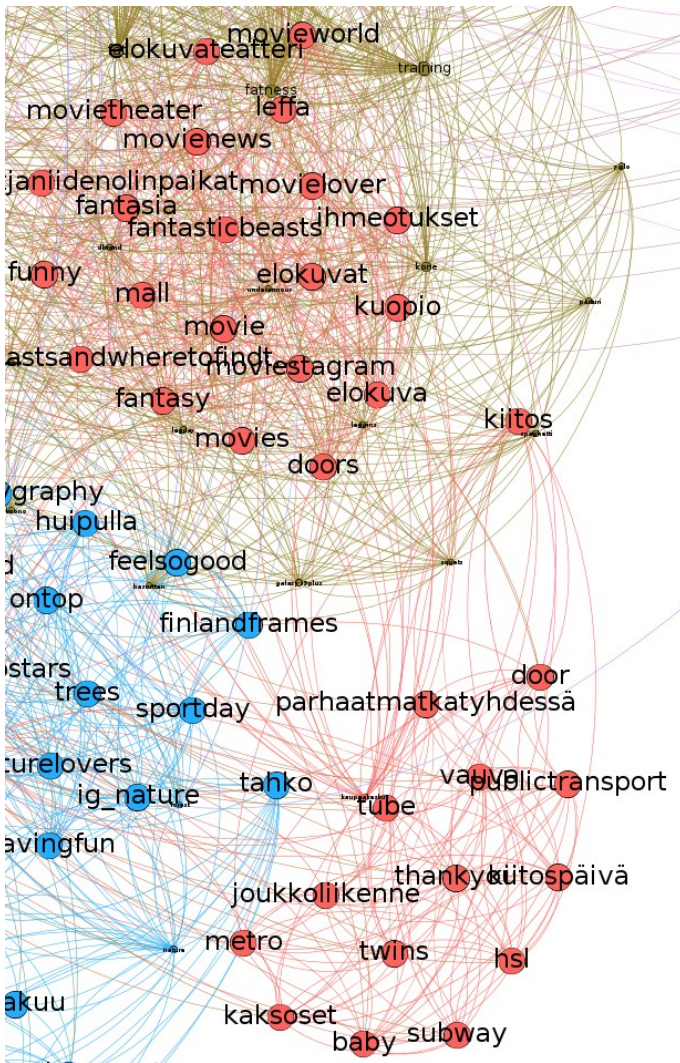


Figure 3 Cluster expressing cultural activities, public transport and gratitude (in red).

All three examples – even the largest and most generic revolving around the key hashtag ‘hissi’ (elevator) – portray consumer creativity, which is quite different from how companies usually think of their offerings. Designs of elevators, their technological characteristics and even regular use of elevators are contrasted with varying meanings consumers attribute to the mundane machine in question. Social media indeed prompts consumers to occupy spaces, declare them significant in varying ways and share narratives of one’s self (Koliska and Roberts, 2021).

While the data used in this network analysis is quite small in size, it succeeds in contrasting established business offerings and can therefore be considered useful for companies. Indeed, accounting for the creativity

of consumers' self-produced media could stimulate companies to reflect on and rethink established takes on product development, concept designs and corporate communication. Consumers show creativity that reach beyond product offerings, technological solutions and user profiles.

## 5 Discussion and conclusions

The task of our ongoing research is to develop a proof-of-concept of how consumer generated interpretations of everyday matters in social media can be used to develop business solutions. Popularly used approaches often fall short because they focus on behavioural analytics, emphasize connections between people rather than interpretations of observations or rely on insufficiently scalable qualitative approaches.

In our research, we develop advanced network based methodologies to explore how consumers interpret a very mundane yet widely used technology – an elevator. Our consumer oriented findings can be considered creative and novel in the sense that they are quite different from established business models, which accentuate functionality and maintenance (Doz and Kosonen, 2010; Schallmo et al., 2017) and relate more to consumption settings (Hirschman, 1980). The examination of consumer coded interpretations (i.e. hashtags in social media posts) shows how the idea of an elevator can be reinterpreted as novelty through insights relating to self-expression, lifestyles, places and culture. Examining connections between the interpretations requires advanced methodologies as well as interpretative skills connected to consumer studies. When we receive access to larger data sets, we expect to achieve clearer recognition of key nodes.

We see that our research contributes to a broader inclusion of consumer creativity to companies' innovation processes especially concerning mundane products and technologies with long life spans. In particular, it is useful to examine consumers activities in environments where they can construct personalized experiences without direct guidance from or interaction with the company in question (see Prahalad and Ramaswamy, 2004). Variety is characteristic for such experiences, and brings out

many opportunities to renew business offerings in ways which consumers find attractive while also accounting for improved economic, social and environmental sustainability. For instance, parts of an elevator could be substituted and redesigned in eco-efficient ways to provide sustainable novelty for its users both in terms of sustaining consumers' interests in new products as well as achieving more sustainable solutions.

The early insights from our research in progress will further be worked on to assist businesses looking to renew their established offerings to embrace consumer creativity with new tools and methodologies. We also hope that companies offering consumer analytics can use the findings to develop their tools to account better for consumer insights and sense-making.

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