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POPULARITY INDICATORS IN ONLINE MEDIA. A REVIEW OF RESEARCH ON THE EFFECTS OF METRIC USER INFORMATION.

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Introduction

900.000 likes on Mark Zuckerberg's latest Facebook post, an average of 2 out of 5 stars by 75 users for a restaurant on Yelp, or a 9.1 film rating by 23.000 movie fans on IMDB: Internet users are constantly confronted with metric information about the popularity of goods, services, or content. These popularity indicators (PIs), which we define as *metric information about users' behavior or their evaluations of entities*, serve as social signals for users who are confronted with them. As prior research shows, PIs are thereby able to influence users' perceptions of the evaluated object and might thus affect their subsequent decisions.

In research, however, PIs are subject to strong conceptual and operational ambiguity. A plethora of terms is used to denote PIs, ranging from "bandwagon cues" (Kim & Sundar, 2014) or "helpfulness ratings" (Walther, Liang, Ganster, Wohn, & Emington, 2012) to "social media metrics" (Stavrositu & Kim, 2014) or "social endorsement cues" (Messing & Westwood, 2014). Moreover, PIs are visualized either graphically (e.g., star ratings) or numerically (e.g., "23 likes"), depict either qualitative (e.g., likes) or quantitative (e.g., clicks) data, and are presented in either real-world (e.g., Facebook) or fictitious (e.g., "an online community") environments.

A systematic overview of conceptualizations, operationalizations, and effects, however, is still missing. Yet, such a systematization is highly necessary to say the least. The mass of information online encourages website providers to implement filters and signals, thus offering guidance for their users. The dissemination of (visible) PIs has increased drastically over the recent years (Napoli, 2010; Webster, 2014). Despite filters oftentimes building upon PIs implicitly, explicitly depicted PIs—as summarized in this work—are apt to serve as social signals and, thus, influence Internet users.

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Due to this high relevance of PIs for (media) organizations, (news) consumers, and, not least, Internet researchers, the aim of this work, first, is to analyze the field’s large body of research that deals with PIs. That is, we provide a review of academic, peer-reviewed papers on PIs in online media ($n = 61$). Second, we address current shortcomings and utilize the results of our review to provide insights for future research.

Method

All papers discussed in this literature review have been obtained by searching the databases Communication & Mass Media Complete, Web of Science, ACM Digital Library, and Google Scholar. Papers had to have been published between 2005 and 2015 and had to empirically focus on the effects of *metric* user information (e.g., “256 users recommend this book”). That said, papers on *content-related* effects of user information (e.g., a comment stating “This book rules!”) were explicitly excluded.

To address the problem of conceptual diversity, two groups of search terms have been defined (see Table 1). All reasonable combinations of the terms within the first ($N = 5$) and second ($N = 8$) group, such as “popularity indicators,” have been used to search for studies. Additionally, the two terms “approval ratings” and “rating visualizations” have been included. All terms were used in quotation marks to enable searching for exact phrases.

Table 1 Search Terms Used in the Literature Search Procedure

Search Term Group 1	Search Term Group 2
popularity	indicators
bandwagon	indications
social media	bandwagons
user	cues
interface	information
	metrics
	ratings
	recommendations

Initial search yielded a total of 133 unique papers that appeared to be meeting the access criteria based on title and abstract. Relevant papers (peer-reviewed conference manuscripts or journal articles), at least to some degree, had to empirically deal with PIs—defined as metric information about users’ behavior or their evaluations of entities. Ultimately, a total of 61¹ articles met our criteria. We coded these articles both quantitatively and qualitatively.

While qualitative coding provides differentiated insights into the studies’ results and implications, categories of the quantitative analysis included but were not limited to a) methodological approach, b) type of PIs (e.g., likes, clicks, ratings), c) independent and dependent variables, d) study context (e.g., online news, e-commerce), e) operationalization of PI extent (e.g., two digit number for low popularity) and f) the direction of effects.

¹ 21% of these articles were conference manuscripts, 79% published studies.

Results

We found surveys to be the most frequently used method in PI research (69%), followed by content analyses (23%) and (online) observations (8%). The majority of surveys employed an experimental approach (93%), while there were no experimental content analyses and just one experimental observation in our sample. In 85% of the articles, PIs were examined as the independent variable—thus, most of the studies investigated the *effects* of PIs, whereas 15% addressed PIs as the dependent variable.

Considering the different types of PIs, ratings were investigated the most (in 52% of all articles), followed by clicks (30%), comments (18%) and other types of PIs (16%). Although mostly designed to look like existing PIs, the majority of studies (54%) focused on fictitious PIs. Researchers investigated PIs in the context of e-commerce and marketing (38%), online communities (33%), online news sites (23%), as well as in connection with blogs and search engines (each 3%).

In the 11 experimental studies that differentiated between different degrees of popularity, low popularity was indicated by either one- (64%) or two-digit (34%) numbers, whereas high popularity was indicated by three- (73%) or four-digit (27%) numbers. Among all experimental studies which employ PIs as independent variable ($n = 52$) the majority finds either clear positive (34%) or nuanced (38%) effects of PIs. In addition, 28% of the studies could not reveal any effects. Dependent variables included users' evaluations of the object associated with PIs (50%), user's subsequent selection of content (42%) and other behaviors (38%).

Discussion

Taken together, to the best of our knowledge, a prototypical study on PIs uses experimental surveys to examine the effects of fictitious rating scales on users' own evaluations in an e-commerce setting. It thereby uncovers nuanced effects prone to moderating influences. In this concluding section, we seek to take the results of the literature review one step further by providing concluding remarks on current PI research. By doing so, we also offer suggestions on how scholars could move forward in PI research.

Conclusion I: The meaning of PIs has to be learned. The more experience users have with a certain PI, the better they are able to use this PI in their selection and navigation behavior.

Conclusion II: The effectiveness of PIs depends on factors external to PIs such as user variables (e.g., informational needs, behavioral intentions, and involvement) as well as context variables determining the vividness and/or salience of PIs.

Conclusion III: To move forward in PI research, a comprehensive theoretical framework which is open for emerging and evolving online environments is necessary.

These conclusions first and foremost highlight the need for a more structured research approach. That is, future (experimental) studies should focus on specific aspects of PI's

effects, such as differences between short- and long-term users or influences of individual predispositions. In addition, large-scale observations seem necessary in order to reveal broader trends in users' interactions with PIs.