

Distinguishing emerging mainstream from bubble hype in research: Quantitative capturing of boundary objects

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2019/06/14

Summary

New concepts often emerge as combinations of two keywords. Yet, as this study will show, among thousands of such new concepts that are proposed in journals and indexed in Scopus® each year, only 2.5% can survive as much as six years. This study aims at the early detection of this small percentage of concepts, which has the potential to enter mainstream as distinguished from bubble hype. Such information will be of significant value to companies and research institutes who agonize about where to invest time and money. Thus, it is important to understand the characteristics of the combinations that have the potential to attract researchers' interest. This study knows from boundary object theory that a certain type of ambiguous concept has the capability to attract interest in different social contexts. If this study can reveal what kind of ambiguity will attract interest, it can get to understand the underlying mechanisms of the diffusion of new combinations of concepts. The purpose of this quantitative study is therefore to develop a methodology to predict the emergence of new mainstream by quantifying boundary object theory. In order to achieve this goal we analyzed 24,202 scholarly papers on business & management topics in major journals published between 2000 and 2017. On that basis we constructed co-occurrence networks of keywords to build a statistical model explaining the characteristics of what it is that ties combinations to last beyond six years. The study quantified boundary objects in three ways in order to capture the growth of concepts consisting of two keywords. Boundary object theory as originated by Star & Griesemer* tries to explain, by way of an example, why collaboration between experts and amateurs works well without consensus. Boundary objects are defined as an analytical concept on scientific objects that reside at the intersection of different social worlds. This study takes the main characteristics of boundary objects to be ambiguity and coherence. Ambiguity is a characteristic that permits different interpretations by members of different social worlds, and coherence works to maintain the integrity of objects. A balance between ambiguity and coherence enables to link researchers with different interests and promote autonomic collaboration without their consensus. The study constructed a prediction model that distinguishes potential mainstream from hypes with 77.4 % accuracy. This accuracy

permits us to claim that this method is useful to distinguish potential mainstream from the rest. In fact, a model shown in the result section produced a highly predictive probability for concepts related to social media and quantitative evaluation. Both social media and quantitative evaluation have in fact become trends. The proposed method is appropriately based on boundary objects theory and this may be suggested as the reason why it can perform well. This method also has the potential to apply in other fields. While on this occasion this study constructed the method from very structured data (i.e., academic papers), it can fundamentally be used where co-occurrence network can be constructed.

* Star, S. L., and Griesemer, J. R. 1989. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39," *Social Studies of Science*, (19:3), pp. 387-420.

How does it relate to CCRC's research themes?

This research is relevant to theme 1: "The Implications of Connectivity on Civilization, Society, and the Self." In my understanding, main problem in the present society is information overload and pile of information resulting from novel kind of connectivity of civilization, society and self. AI technology can be understood as solver of this problem by finding significant patterns from it. The novel and valuable patterns emerge as combinations of information. Thus, this research tries to understand underlying mechanisms of the combinations that last long. While the large number of concepts, that combined with lots of information, are proposed every day, many of them disappeared and few become new trend. Distinguishing emerging mainstream from bubble hype produces important information for people, companies or research institutes because it supports long term decisions of investment. Also, in society level, it enables us to avoid populism that bubble hype triggers (e.g. fake news). If we can concentrate on concepts that have persistent value, it is become easier to predict and design future civilization through which what self, autonomy and responsibility are is changing radically. Finding concepts that have potential to become mainstream is valuable for designing cyber civilization because, as Hacking* pointed out, concepts have capability to make up understanding on what we are and who we are. For example, a concept "trauma," which was diffused after World War, changed people who are suffering from mental shocks into "trauma patients." It changed understanding how they recognized themselves and how society support them. That is, this concept changed self and society. A concept of cyber

civilization and related concepts can have similar effects on people who live in this society if it becomes to be used persistently and can defines who we are. This research can contribute to predict which direction our society is going for. It can provide implication for making better society.

* Hacking, I. (2002). *HISTORICAL ONTOLOGY*. Cambridge: Harvard University Press.