The uncertainty conundrum: hitching innovation to information

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Abstract. The provision of information and data has coalesced around a few distinct camps: one being the gatekeepers who see access paywalls as a way of subsidizing the costly associated services of content cultivation, archiving, and provision; and another being the defenders of openness in information provision, who believe that information price-tags hinder the expansion of knowledge. While this paper does not propose to reconcile the debate between the two camps, it does seek to identify signal trends that could motivate an evolution in thinking among both camps to unify around a response to the challenges surrounding information provision.

Keywords: Information as a commodity, fee-based information, firewall, innovation, predictive accuracy

An analogy commonly made today suggests that if oil was the primary resource commodity of the 20th century, then data will be oil's analogue in the 21st. The information services landscape to which we became accustomed in the last century - driven in large part by academia - is transforming beyond recognition. But whereas oil's value in a manufacturing age was always predicated on its scarcity and accessibility, the value of data in an information age is predicated on both access and ubiquity.

Information as a commodity has never been more accessible or in demand. Digitization has enabled more publically-available documents than ever before, a particular boon to vertical industries and fields dependent on specialized knowledge. However, with the rise of open source information comes archiving complexity, cost competition, and, on a more significant level, mistrust. A generation is coming to grips with the uncertainty inherent to our new Information Age: authorities responsible for trustworthy information distribution are being questioned in novel ways, whether through memes like "fake news" or concerns over vested interests exacerbating the gap between the information haves and have-nots. But this uncertainty will be compounded, once nascent technologies become more entrenched.

Unfortunately, one net negative effect of digitization is the end of the era in which our technologies for establishing truth and evidence - like recorded audio and image - dominate. Today, we are faced with new technologies capable of fabricating deception. The advent of programs like Lyrebird (which can take audio files of a person's voice and generate recordings of that voice reading a script of anyone's choosing) [1] and Face2Face (which can do similar things with video) [2] underscore the importance of training our attention on how information service providers need to evaluate their role in a digital era ecosystem. While users are only now coming to grips with the size of the disinformation problem that social networks have a

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role in disseminating, new technologies promise an exponential increase in the mistrust of information distributors once they reach a tipping point.

Heightening the challenges of uncertainty information services will face are the growing lines of evidence pointing to the expertise paradox. Western education systems still privilege a columnar structure that emphasizes niched-specialization in an area - hence the drive to acquire advanced degrees; however, research on expertise (see Tetlock [3] and Mellers et al. [4]) observes the disconnect between expertise and predictive accuracy in an expert's selected subject matter field. Experts tend to demonstrate predictive accuracy little better than random chance due to the status-related pressure to avoid reputational risk and conform to expert consensus. By contrast, generalists or those with a broader range of knowledge can display significantly better accuracy in predicting outcomes in subject matter fields in which they have no special informational advantage. This dichotomy between "hedgehogs" (experts) and "foxes" (generalists) identified by Professor Philip Tetlock of the University of Pennsylvania in his book *Expert Political Judgment: What is it and How Can We Know?* has been tested in several experiments, the most notable one being the four-year Aggregative Contingent Estimation (ACE) program (see: https://www.iarpa.gov/index.php/research-programs/ace) funded by the Intelligence Advanced Research Projects Activity (IARPA) from 2011–2015 [5]. Addressing this imbalance requires training in cognitive de-biasing and testing in calibration and discrimination - training that is not integrated within the Western education system.

The development of counterbalancing effects to these issues will require time, finances, and political will. But an opportunity lurks within these difficult problems: the need for verified and vetted information systems as a bulwark against deception delivered through publically-available data domains. Systems that can leverage appropriate branding and wide access and offer themselves as a clear alternative to muddier pools of open-source information will be at an advantage in the digital era.

But gaining this advantage still requires addressing the need for synthesis between the costs associated with maintaining high-quality information and the open access scientific and innovative advances demand. Three questions information system providers should be asking themselves now are: What immediate direction must information organizations take to preserve their own sustainability? How can different positions on the open-source spectrum be harmonized? And how can information system organizations partner with solutions/platform-providers to create new revenue-generating models?

Partnerships with new platform providers, such as forecasting tournament platforms (and their associated training programs [6]), are just one pathway information systems may choose to explore. As social networks are reformed and evolve, new venture avenues may yet open.

The ground truths of our digital age mandate new thinking and risk-taking to weather the trials technology places in front of both information providers and users. Such risk-taking will include a certain amount of creative destruction and restructuring, especially with regards to business models. But with a near-term future marked by increasing skepticism and cynicism over what people see and hear, information providers that can maneuver their brands and public identities around information trustworthiness, reliability, and integrity will acquire an upper hand.

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