

Information Axioms

Preface

This working document distills “information axioms” for emerging policy networks. We culled these information axioms from a variety of analysts whose work examines primarily – but not wholly – emerging commercial information networks on the Internet. These “axioms” do not necessarily apply to non-profits, or true communities, but rather, are to serve as a starting point in understanding the role of information and information technologies in the policy process. We intend to produce a similar set of axioms for the way information is used by contending policy currents in information battles in US foreign policy decisionmaking.

Axiom 1 – Metcalf’s Law

If there are n people in a network, and the value of the network to each of them is proportional to the number of other users, then the total value of the network (to all users) is proportional to $n \times (n-1) = n^2 - n$. (Shapiro and Varian, 184)

Member aggregation is more important than the type or amount of resources owned. (Hagel and Armstrong, 14)

Axiom 2 – Early Entrants Win the Field

There is no substitute for experience. Those who aspire to play the role of community organizer or owner will need to move quickly and aggressively to increase the likelihood of becoming the first to aggregate a critical mass of members in a target area. (Hagel and Armstrong, 75)

The longer a new entrant waits, the more difficult (and expensive) it will be to pry members out of existing communities....new entrants will confront a concentrated business driven by large community organizers who enjoy substantial operating cost advantages, clear differentiation through unique assets, and high switching barriers for their existing members. (Hagel and Armstrong, 80)

That’s why preemptive strategies become so important in markets where increasing returns prevail – if you don’t get there first, you may be too late (Hagel and Armstrong, 6-7).

Axiom 3 – Significance Precedes Momentum

In the past, an innovation's momentum indicated significance. Now, in the network environment, where biological behavior reigns, significance precedes momentum (Kelly, 35).

The products new purchasers learn about depends on which products the previous purchasers "polled" or sampled and decided to buy. They are therefore likely to learn more about a commonly purchased product than one with few previous users. Hence, where buyers are risk-averse and tend to favor products they know more about, products that by chance win market share early on gain an information feedback advantage. Under certain circumstances a product may come to dominate by this advantage alone (Arthur and Lane, 69).

[this type of market is subject to a constriction of information]

Axiom 4 – Standards as Power

In the network economy, ever-less energy is needed to complete a single transaction, but ever-more energy is needed to agree on what pattern the transaction should follow (Kelly, 69).

Eventually technical standards will become as important as laws (Kelly, 71)

Since networks are multiple, the interoperating codes and switches between networks become the fundamental sources in shaping, guiding, and misguiding societies (Castells 1996, 471).

We care about standards because of the fantastically complicated economic question of who captures the often considerable value that is created through the establishment of a standard ...[s]tandards are path-dependent, and that because of network effects, they tend to have a winner-take all quality, with one standard becoming dominant and devotees of other standards becoming stranded (Agre 1998(b), 6)

Axiom 5 – Producer and Consumer Utility

Your reward = total value added to industry multiplied by your share of industry value. (Shapiro and Varian, 198)

*Consumer utility of information = parsimony, timeliness, and quality;
 $U_i = P, T, Q$ (Hunter)*

Effectiveness (F) of an organization using web technologies is defined as the least constrained systems fit between the coordination of activities through knowledge exchange and the validity of the information exchange. These are measured by the price of knowledge transactions (P) in resources such as time and the accuracy (Y) of both the content and process in the exchange such that: $F = f(P, Y)$ (Demchak, Friis, La Porte – ask not to cite).

Axiom 6 - Gatekeepers, Intermediaries, and the Attention Deficit

The number of persons from whom any official can effectively receive messages in a given period is inversely related to the average length of the message (Downs 112).

A plentitude of information leads to a poverty of attention. Attention becomes the scarce resource, and those who can distinguish valuable signals from white noise gain power. Editors, filters, interpreters, and cue-givers become more in demand, and this is a source of power (Keohane and Nye, 89).

Technology encourages the proliferation of intermediaries. Everywhere networks go, intermediaries follow. The more nodes, the more middlemen. (Kelly, 99-100).

When information must be passed through many officials, each of whom condenses it somewhat before passing it soon to the next, the final output will be very different in quality from the original input; that is, significant distortion will occur (Downs 269).

Axiom 7 – Positive Feedback Loops

Virtual communities create increasing rates of return (or positive feedback loops) in three ways:

1) when a business incurs large up-front expenditures to develop a new product or service and the incremental cost of producing each incremental unit of the product or service is minimal;

2) as businesses move up the learning curve, or experience curve...businesses typically achieve a certain percentage reduction in the cost of making and delivering that product or service to the customer;

3) the last kind of increasing returns leverages network effects: the more units of product or service that are deployed, the more valuable each unit becomes. (Hagel and Armstrong, 44)

Positive feedback makes the strong get stronger and the weak get weaker, leading to extreme outcomes. (Shapiro and Varian, 175)

In the industrial economy success was self-limiting; it obeyed the law of decreasing returns. In the network economy, success is self-reinforcing; it obeys the law of increasing returns (Kelly, 25).

Axiom 8 – Differentiation of Products and Pricing

The high first-copy costs of information and information technology inevitably lead to price and product differentiation (Shapiro and Varian, 298).

Information is costly to produce but cheap to reproduce therefore you must price your information good according to consumer value, not according to your production cost (Shapiro and Varian, 3).

Virtual communities are turning market dynamics upside down by creating “reverse markets” – markets in which the customer, armed with a growing amount of information to search out vendors offering the best combination of quality and price tailored to his or her individual needs. In fact, the ability to access more information and thereby extract more value from vendors will ultimately be one of the major incentives drawing members into virtual communities (Hagel and Armstrong, 17).

In the system, because of the potential diversity of contents, the message is the message: it is the ability to differentiate a product that yields the greatest competitive potential (Castells 1996, 368).

Axiom 9 – Switching Costs and Lock-in

Small consumer switching costs can constitute large barriers to entry, especially for mass-market products (Shapiro and Varian, 109).

The total cost of switching = costs the customer bears + costs the new supplier bears (Shapiro and Varian, 112).

When the costs of switching from one brand of technology to another are substantial, users face *lock-in* (Shapiro and Varian, 112).

Axiom 10 – Free Information: cooperation in a competitive environment

Precisely because standards reduce lock-in, they shift the locus of competition from an early battle for dominance to a later battle for market share (Shapiro and Varian, 231).

Because prices move inexorably toward the free, the best move in the network economy is to anticipate this cheapness (Kelly, 53).

If goods and services become more valuable as they become more plentiful, and if they become cheaper as they become valuable, then the natural extension of this logic says that the most valuable things of all should be those that are ubiquitous and free (Kelly, 57)

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