Peripheral Innovation in the Social Media Ecology

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ABSTRACT

We examine the ecology of social media, and the ways users' consumption of social media has led to fragmentation of personal data and artefacts making service design and innovation difficult to tailor for the masses. Rather than hoarding user-generated data, incumbents have begun to adopt open API strategies to induce creation by developers of mashups complementing their core services. This harnesses the strength of weak ties to sustain the ecology and strengthen the incumbents' positions. The degree of openness through use of APIs not only focuses incumbents' resources on their core services but also induces independent developers and new startups to tinker and experiment with new peripheral services. We use the case of Twitter to illustrate an open API strategy, and to underscore the role of developers as an innovation gatekeeper bridging the fragmented social media landscape.

Categories and Subject Descriptors

H.1.1 [**Models and Principles**]: System and Information Theory– *Value of information*

General Terms

Management, Measurement, Economics, Theory, Legal Aspects,

Keywords

Open API strategy, peripheral innovation, weak ties, long tail

1. INTRODUCTION

Social media ecology revolves around a few incumbents (e.g., YouTube, Twitter, Facebook) with billions of digital artefacts (e.g., blogs, photos, and videos) uploaded and shared daily by users. Each incumbent is characterised by a core service, and there is little technological differentiation as all can copy one another, offering similar and all-inclusive social media tools and services. Technology alone does not give a significant competitive edge, as it seems that the first-mover advantage significantly directs towards which social media site individual users will gravitate. It is usual for social media users to consume a wide range of services, with their online activities scattered and varied according to network effects. For example, when instant messaging, rather than solely using Facebook's chat facility, users use a range of services such as Skype, Google Talk, and MSN Messenger.

With users' digital artefacts and their digital footprints being distributed across different media sites, it is harder for each incumbent to anticipate needs and create a sufficient variety of services to cater for the masses. Recent years have witnessed a radical change in strategic thinking, moving from hoarding data to releasing it through open APIs. The aim is to induce contributions from external developers with a view that developers are more likely to be both a producer and a consumer of social media services. This *prosumption* not only enhances digital innovation in a peripheral sense but also complements the core services offered by the dominant players.

This paper examines the service logic of Twitter's open API strategy, and its impact on developers as an innovation gatekeeper to meeting the long tail requirements in social media consumption. We claim that an effective API strategy should be able to attract developers' attention and effort to develop apps and/or services to complement their core services. Several questions remain: *Does it matter how much control to relinquish in relation to the permissible level of peripheral tinkering? What is the degree of openness in formulating an open API strategy? Is an open API a viable business model?*

2. API Strategy and Weak Ties

User-contributed data to social media sites possesses two key characteristics of a public good: it does not exclude anyone from using it to develop services (*non-excludability*), and consumption by one party does not diminish the value or ability of others to consume the same (non-*rivalry*). With traditional business logic *customer insight is proprietary*, suggesting the social media providers should not release data. Yet the pros of release via an API can outweigh the cons if release induces creative use by external developers and increases the recombinant capability of the incumbents. This creates dynamic resources harnessing the contributions of independent developers and new startups, by default as weak ties. Perhaps the mostly cited theory relating to the dynamic aspect of network resources is Mark Granovetter's theory of the strength of weak ties [1]. Essentially, weak ties provide the conduits of new resources including new knowledge and information by bridging networks of networks that are out of reach by cohesive networks characterized by strong ties. Opening an API instigates the conditions for weak ties formation, increasing the liquidity of interchanges across different social media sites, creating novel and complementary services to the core services.

A web API (Application Programming Interface) defines a set of HTTP-based message interchanges, typically now following the RESTful architecture, which encourages combination of multiple services easier into mashups [2]. Because mashups are built using APIs, we can use the links between mashups and APIs to examine the peripheral activities carried out by developers and the dynamics underpinning weak ties formation.
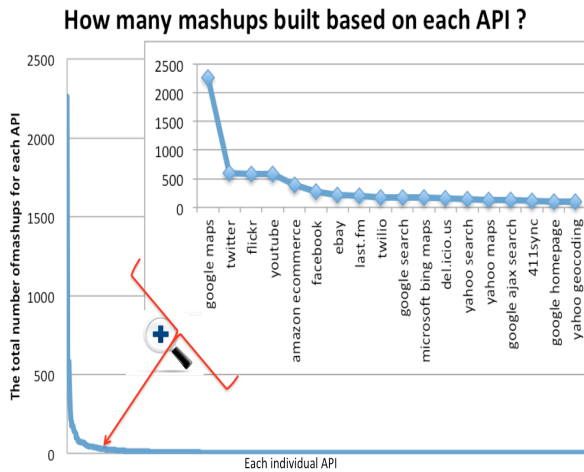
Figure 1: Distribution of Mashups over the Top 18 APIs

3. Research Methodology

We wrote a Python script to collect data from ProgramableWeb.com, which lists all the major APIs and mashups in the social media marketplace. We collected information about each web service including category, tags, developers, date and inter-dependency between mashups and APIs to construct the social media ecology. At the time of data collection in August 2011, there were **3712** APIs and **5997** mashups. Most APIs are provided by large incumbents, e.g., Google, Twitter, Facebook, Flickr; while all mashups were created by individual developers.

In general, mashups integrate multiple information sources via two or more APIs, with integration a way to combine data and information to create new services that complement incumbents' core services. We found two variants of service complements or complementarities. The first and most frequent was based on integrating information through multiple APIs (e.g. *api A1 + api A2 => mashup M1*). The second was based on one listed API (e.g. *api A3 => mashup M2*) in combination with external information sources. This type of complementarity was commonly found with tool service APIs, e.g., Google Maps API.

To represent the social media ecology relations graphically, we represent each *api Ai* and each *mashup Mj* by a node, and connect those APIs on which a mashup depends, i.e., there exists an edge from *Ai* to *Mi* if *Mi* depends on *Ai*. The number of edges leading away from a node is said to be the outdegree of that node; the number of edges leading into a node is the indegree.

4. Discussion & Conclusion

As with platform leadership, success of an open API strategy is driven by the degree of openness and its inducement of external involvement. With Twitter the terms of use are not very restrictive: it can be used as long as third party do not duplicate core services of Twitter. This contributes to the attractiveness of the Twitter business ecosystem as Twitter, the incumbent, does not enter complementary markets. If it did, it would likely deter other parties coming into the business ecosystem as complementors [3]. Also, by not entering into the complementary market, it attracts developers' attention and resources (Figure 1), and directs more traffic and generates more revenues through subscriptions to its API.
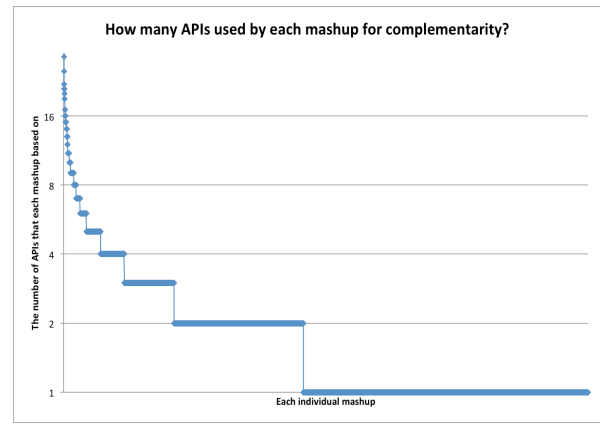

Figure 2: The Distribution of Used APIs for Mashups

In comparison to Twitter we found that not all social media sites with open APIs attract the same level of developers' attention. Figure 1 represents the distribution of mashups per API across some of the major APIs. There appears to be direct relationship between the degree of openness (lack of restrictiveness in the terms of use) and the number of mashups created.

The platform strategy [4] can also explain the success of API strategy. A key part of a platform strategy is developing a core technology that is useful and reusable by others. The Twitter service ecology suggests Twitter can be applied in diverse ways to meet the long tail's demands in how users consume social media. Another aspect of a platform strategy is to encourage developers and third parties to the platform by lowering the entry barriers of adoption. Twitter recognises and adapts other APIs commonly used for mashups, so developers have less friction in use of technology for innovation.

Incumbents should acknowledge the role of developers as innovation gatekeepers. Most digital innovation occurs through mashups external to major social media sites, at peripheral locations rather than within the core. We calculated that one mashup would combine 13.2 different APIs in average. The distribution of average APIs for mashups also follows a power law (Figure 2). Less than half of the mashups are built on a single API, and more than a third involves three or more APIs. The study of Twitter allows us to begin to establish a set of useful metrics to gauge the vitality and the contribution of open APIs to the social media ecology. We intend to compare and contrast Twitter with other major incumbents to better understand how open API and in particular the degree of openness can be used in a disruptive strategy for digital innovation.

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