DECODING THE LEAD USER INNOVATION LANDSCAPE

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IPSOS VIEWS

WHO DRIVES INNOVATION?

Innovation research has long shown that 'lead user' customers, not producers, are the real pioneers who create many radically new products and services. Essentially all sports, such as skateboarding, mountain biking and windsurfing were developed and pioneered first by these who participated in them. These individuals, or lead users, collaborated to build their own equipment, techniques, rules, and contests for years before producers got involved. And surveys show that the same is true for every consumer product category (von Hippel, 2017), both for initial innovations and product modifications.

For example, the first personal computers were developed by lead users. So were the first personal 3D printers. Even new hair styles, from mohawks to dying hair bright colors - or more recently grey - come about because of those first pioneering 'users' who set the trends. Think also of the new medical apps being built into smartphone and smartwatches today – these were done by user "hackers" first (von Hippel, 2017).

Producers (and the organisations that advise them) must quickly adapt their innovation processes to this new reality.
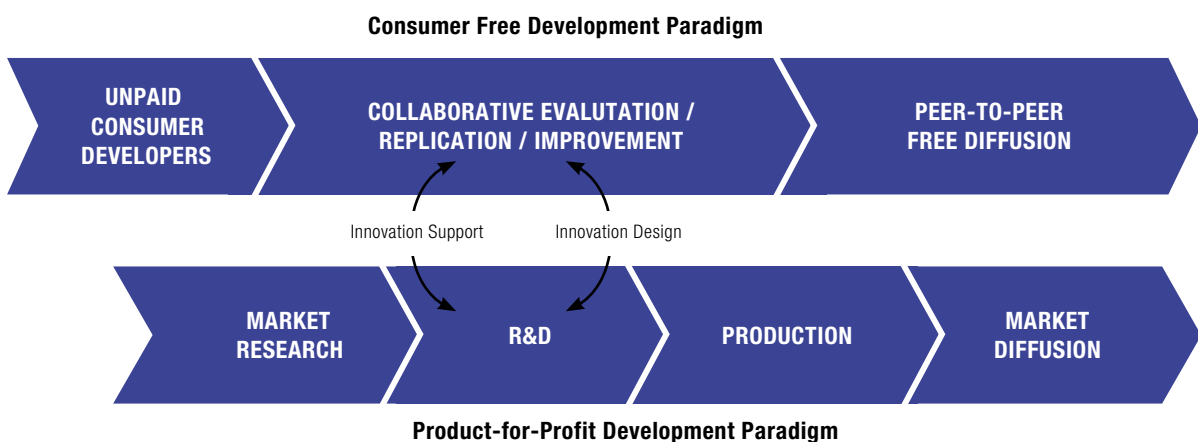
As represented in the figure below, they must develop methods to systematically find, screen, and commercialize lead user-developed innovations in addition to creating new product concepts in-house.

Searching for **Lead User Innovations** is not a new concept. Pioneered by Professor von Hippel over 30 years ago, it has since been studied and developed by hundreds of academics and practitioners. However, its practical value has long suffered because of the cost of finding these kinds of innovations.

Today, we claim that semantic algorithms applied to the universe of user-generated content can significantly improve the efficiency and expense of identifying commercially promising Lead User Innovations in consumer goods fields.

In a recent R&D study conducted with Eric von Hippel from the Massachusetts Institute of Technology (MIT), we show that promising user innovations can be found in any consumer product or service fields within a week or two of using semantic network analytic and memory model techniques. This requires an analyst working together in a close and "agile" collaboration with a subject matter expert.

Figure 1 The user and producer innovation and diffusion paradigms

Consumer Free Development Paradigm

UNPAID CONSUMER DEVELOPERS → COLLABORATIVE EVALUATION / REPLICATION / IMPROVEMENT → PEER-TO-PEER FREE DIFFUSION

Innovation Support   Innovation Design

MARKET RESEARCH → R&D → PRODUCTION → MARKET DIFFUSION

Product-for-Profit Development Paradigm

Raasch and von Hippel, 2012

LEAD USER INNOVATIONS IN THE "ECONOMIES OF UNSCALE" ERA

Large organizations have always been able to leverage economies of scale, using mass production and distribution as key drivers for success. But now, enabled by technology, artificial intelligence and the availability of data, small and agile organizations can effectively challenge and beat large players in niche markets, or even disrupt well-established markets. In today's new and volatile business era, successful innovations are essential.

Still, Mark Payne's analysis of innovations in the 21st century, *How to Kill a Unicorn*, states that 90% of innovations fail. Understanding the root cause has always been challenging. But, a lack of customer centricity to find and deliver true user needs due to the general market orientation can be considered largely responsible for the high innovation failure rate.

In his 2017 book *Free Innovation*, von Hippel advocates that users take a seat at the center stage of the modern innovation process. Research has already established that lead users innovate ahead of general market demand. And for this reason, producers have always had an interest in commercializing Lead User Innovations. However, the difficulty of identifying lead users and the associated time and costs have deterred many producers from making this regular practice. The process used to identify lead users would involve a chain of interviews with experts called "pyramiding" and take a very skilled team of four people approximately four months to complete.

"An improved lead user identification method will assist more producers to innovate faster, more efficiently and more effectively."

LEAD USERS TAKING CENTER STAGE

Lead users are known to pioneer new types of products and services that later prove valuable to more widespread audiences (See Urban and von Hippel, 1988; Franke et al, 2006). Indeed, Poetz and Schreier show that in a comparison of new baby feeding products, ideas developed by lead users scored significantly higher than ideas proposed by in-house producer experts in that field – even according to the producer experts themselves (Poetz and Schreier, 2012).

Despite the time costs involved in identifying lead users, about 24% of current producers claim to include lead user methods in their market research portfolios, and regard them as effective (Cooper and Edgett (2007, p.4). It is our belief that with an improved identification method this proportion will increase significantly and assist producers to innovate faster, more efficiently and more effectively.

At Ipsos, we saw an opportunity to improve this process by leveraging consumer generated data coupled with machine learning techniques for semantic analysis. We approached Professor Eric von Hippel from the MIT Sloan School of Management, the leading authority on Lead User Innovation, to explore the following hypotheses:

> What if we could utilize the web as an innovation mine to detect lead users in a specific field of interest?
>
> What if we could scrape the entire content universe in a domain and develop semantic algorithms to filter out Lead User Innovations?

We thought this method could prove successful because those consumers with an inherent motivation to develop novel solutions in their field (without receiving compensation from companies) are generally willing to reveal details of their innovations with peers on the web without patents or other forms of intellectual property protection. And given the amount of social data available on the web for almost any subject, it was clear that efforts should be made to update Lead User Innovation search methods.

The following outlines our learnings and the potential client benefits we uncovered.

OUR LEAD USER INNOVATIONS IDENTIFICATION METHOD

The ineffective pyramiding method mentioned earlier dates back to the mid-1990s when internet search method development was in its infancy, and it remains slow and costly today. The new method we have developed in partnership with the MIT Innovation Lab can identify Lead User Innovations in less than one week, and only requires one analyst and the supervision of a category expert.

And importantly, we are discovering the technique can be used to identify lead users across categories. While traditional methods would search for the lead users themselves before finding any innovations they may have developed, our proposed user-generated content-based method directly scans the entire ecosystem of user innovations and assesses their commercial promise as a second step. Additional analysis can also show the correlation between lead user-developed innovations and commercial promise.

Our tested research process is illustrated below. It begins by 'scraping' open websites for user-generated content (UGC) as **Step 1**.

Most useful are the more specialized websites where enthusiasts and experts gather to share information on specific subject matter. An audit then ensures the subject relevance of the content collected by removing mistakenly classified entries that share seed words with search taxonomies in other topical domains.

In **Step 2**, we apply a series of machine-learning based semantic filters including a memory model to isolate only the most relevant content for detailed examination.

After the data corpus is condensed to highly relevant and promising content it undergoes expert validation in **Step 3**. Using context and subtext, experts can confirm the content and ensure that it meets the criteria of novel and user-generated. They also identify the diffusion of user innovations in the domain so that analysts can better judge their commercial attractiveness for manufacturers.

A combination of user generated mentions and search behavior is used in **Step 4** to learn about adoption trends of the identified Lead User Innovations over time.

In today's new and volatile business era, successful innovations are essential

Figure 2 Lead user innovation identification process overview

Step 1

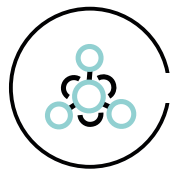'Scraping' open websites for user-generated content (UGC).
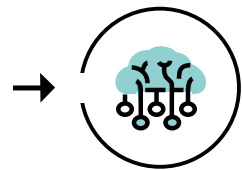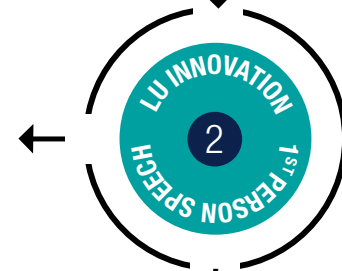
1

UGC SCRAPING

RELEVANCE AUDIT

Step 2

Apply a series of machine-learning based semantic filters including a memory model to isolate only the most relevant content for detailed examination.
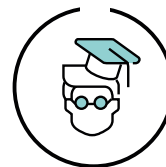
LU INNOVATION
1ST PERSON SPEECH
2

SEMANTIC NETWORK ANALYSIS

SEMANTIC MEMORY MODEL

Step 3

After the data corpus is condensed down to highly relevant and promising content for identifying Lead User Innovations, it undergoes expert validation.
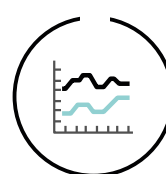
3

EXPERT VALIDATION

Step 4

The combination of user generated mentions and search behaviour to learn about adoption trends of the identified Lead User Innovations over time.

4

INNOVATION DIFFUSION ANALYSIS

KITESURFING STUDY TO PILOT OUR METHOD

To test our hypothesis as to whether applying semantic analysis algorithms to user-generated content would help us identify commercially promising user innovations, we conducted a pilot around kiteboarding equipment. We chose kiteboarding for our proof of concept because research shows that this is a particularly active user innovation domain (Tietz et al. 2004, Franke et al. 2006). Therefore, if our method did not yield evidence it would suggest that it was failing to capture Lead User Innovations that do in fact exist.

We began our test by collecting a large universe of user-generated content composed of more than 200,000 posts from 1999 – 2018, scraped from over 9000 websites across the globe. Interestingly, our kiteboarding example showed that more than 90% of the relevant consumer-generated content came from specialized forums and other niche sources such as kiteforum.com, seabreeze.com.au or powerkiteforum.com.
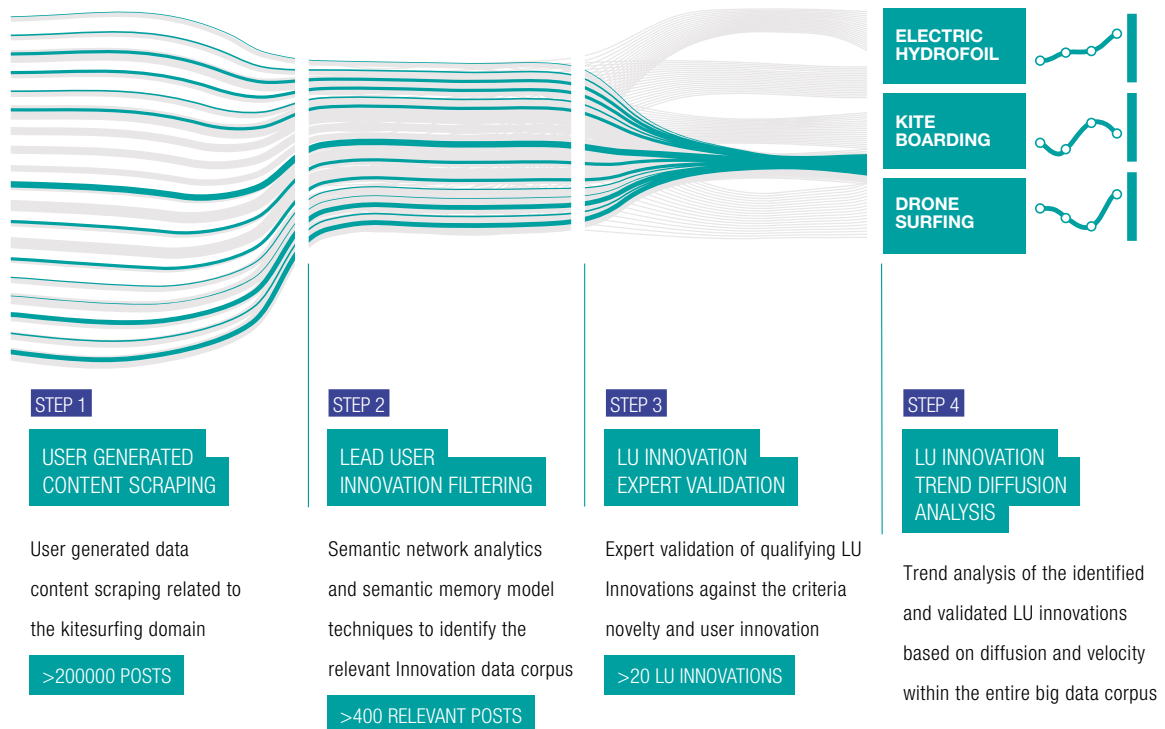
In fact, as can be seen in the graphic below, more than 20% of the overall user-generated content for our study was sourced from only two of these specialized forums.

Content from large, heavily-trafficked social media or digital outlets such as YouTube, Reddit, Twitter or Facebook played an insignificant role as exchange sources between experts.

Applying the Lead User Innovation method to the kitesurfing domain effectively identified more than 20 functionally novel innovations. The content that remained after the filtering process was evaluated and curated by a category expert against the established Lead User Innovation criteria. This found that least 50% of the identified innovations were already commercialized by producers, proving that this big data method can identify new commercial opportunities for producers. From the innovations identified, they were primarily improvement innovations, or user-generated improvements to kiteboarding equipment within existing kiteboarding practice.

But, the Lead User Innovation method also allowed us to identify more radical innovations with respect to current practices within the sport. Each of these significantly altered the nature of the sport and could potentially incubate an entirely new sporting direction.

Figure 3 Kitesurfing pilot study - Research design & results

STEP 1

USER GENERATED CONTENT SCRAPING

User generated data content scraping related to the kitesurfing domain

>200000 POSTS

STEP 2

LEAD USER INNOVATION FILTERING

Semantic network analytics and semantic memory model techniques to identify the relevant Innovation data corpus

>400 RELEVANT POSTS

STEP 3

LU INNOVATION EXPERT VALIDATION

Expert validation of qualifying LU Innovations against the criteria novelty and user innovation

>20 LU INNOVATIONS

STEP 4

LU INNOVATION TREND DIFFUSION ANALYSIS

Trend analysis of the identified and validated LU innovations based on diffusion and velocity within the entire big data corpus

ELECTRIC HYDROFOIL

KITE BOARDING

DRONE SURFING

IMPROVEMENT INNOVATIONS

HARDSHELL HARNESS

A new harness that better distributes the pulling force of the kite across the kiteboarder's body.

KITE LINE TRANSFORMATION

An alteration to the geometry of the rope lines connecting the surfer to the kite to improve control over the kite's direction of motion and power.

KITE SEAT FOR DISABLED PEOPLE

A special seat attached to a standard kiteboarding board enables people with certain disabilities to participate in the sport.

RADICAL INNOVATIONS

ELECTRIC HYDROFOIL

This eliminates the kite as the source of motive power, replacing it instead with an electric motor mounted on a hydrofoil under the board.

DRONE KITESURFING

Also replacing the conventional kiteboarding kite, a powerful drone flying overhead provides the motive power. New degrees of freedom are gained because users are no longer at the mercy of wind conditions, and can, for example, kiteboard even under dead-calm conditions.

KITEBOATING

A kitesurfing kite is applied to pull a boat instead of a board. This could also represent a radical new direction for sailing — a "sail" that is in the air high above a boat can access different and often more powerful sources of wind energy than a sail attached to a mast on the boat itself.
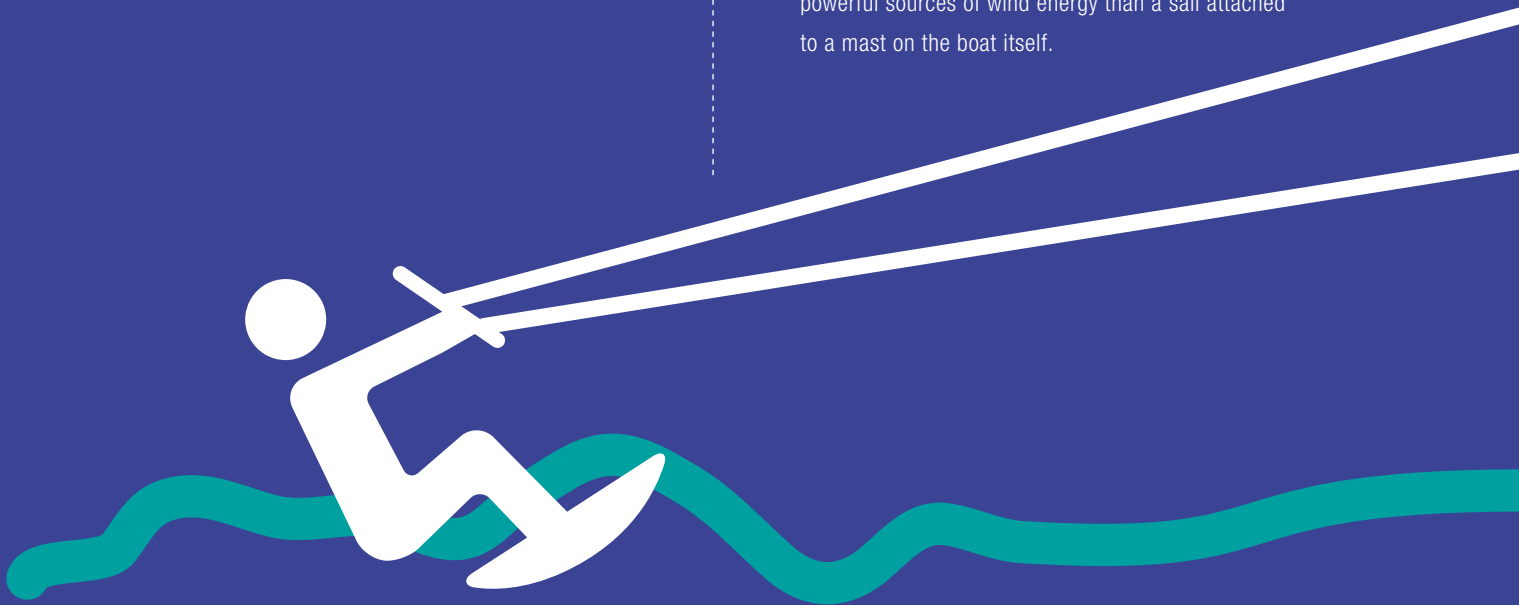
TREND AND POPULARITY ANALYSIS

Another advantage of our method, beyond the identification of Lead User Innovations, is that we can use social and search data to determine which ideas and innovations are gaining traction and thus worth commercializing, taking the guesswork out of the innovation process. We do this through the combination of user-generated mentions and user search behaviour to explore and understand adoption trends of the identified innovations over time.

A user's topical Google search can be considered a signal of intention, where kite surfers hope to simply find information or purchase a product. In contrast, user-generated mentions of the specific innovation are signals of deeper interest and desire for more detailed information, including discussing the innovation with expert peers, or to seeking advice and instruction around the innovation. This trend and popularity analysis unveils additional insights on the velocity and diffusion of the identified innovations in the specific domain to enable analysts to better judge the commercial attractiveness of each innovation for producers.

Figure 4 Trend diffusion - Electric hydrofoil


SOCIAL MENTIONS   SEARCH INDEX
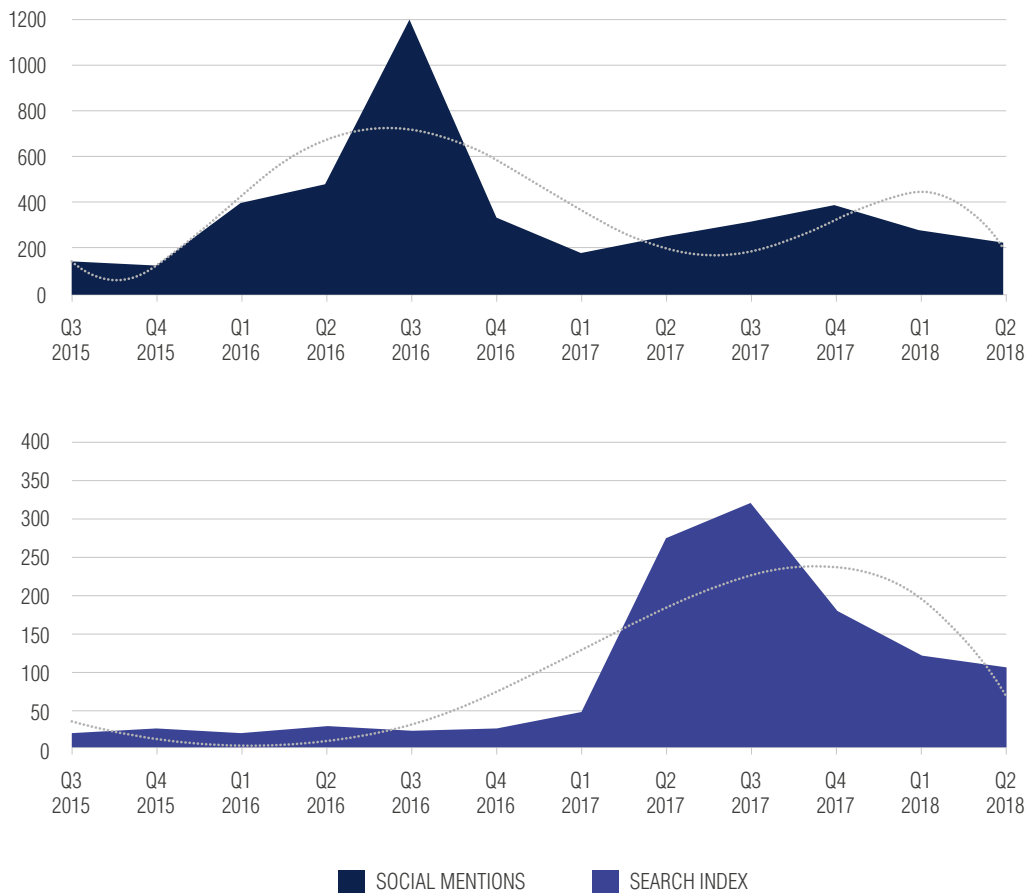
Source: Ipsos Social & Search data, 2015 – 2018

The charts below show that the electric hydrofoil innovation attracts more user interest than drone surfing. The trend data analysis from the kiteboarding study suggests that Lead User Innovation trends typically begin with expert discussions in domain-specific forums with those who are ahead of the curve before they become visible in search data. We also see that the subject matter interest can spread to a broader audience, even though the delayed effect between social mentions and searches was shorter for some of the more radical innovations like drone surfing.

Finally, once a user-generated innovation has been identified, content-specific searches can be carried out to gain more information, both on the innovation and its commercial potential.

As the users have an observable online identity attached to the content they are writing, these individuals can be contacted by researchers to learn more (privacy regulations permitting).

Figure 5 Trend diffusion – Drone surfing

SOCIAL MENTIONS   SEARCH INDEX
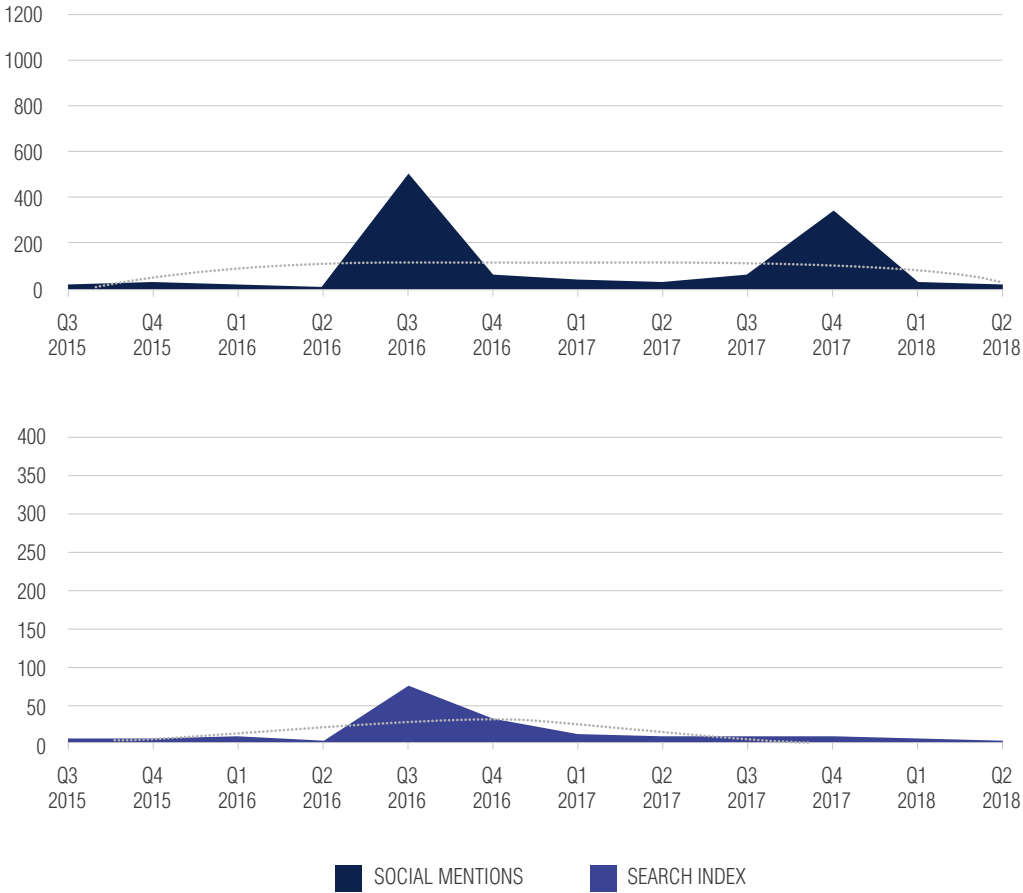
Source: Ipsos Social & Search data, 2015 – 2018

A NEW DIVISION OF LABOR

To make these techniques as valuable as possible, it is also important to learn how to incorporate the Lead User Innovation identification practices we have described into marketing and corporate product development practices. To do this, companies as a whole - and market researchers specifically - need to learna new division of innovative labor.

Marketers and market researchers should no longer assume that it is their task to develop innovative product concepts for consumers. Instead, they should reallocate the resources devoted to that task to the identification and evaluation of concepts developed and prototyped by lead users.

This may seem like a threatening change to many market researchers, but there will always be a great deal of creative work remaining for in-house practitioners. They are the ones who must carry out Lead User Innovation search projects for example. Additionally, they can apply existing conventional product concept evaluation techniques to determine how to improve user prototypes to a stage at which it is suitable for the general market.

SIX KEY TAKEAWAYS

1 Successful innovations are crucial in today's volatile business environment with insurgent brands disrupting entire categories

2 Lead users themselves are often the best innovators and develop novel product ideas ahead of market demand

3 These pioneering consumers should take center stage of the modern innovation process

4 Only 24% of producers currently use and value Lead User Innovation methods due to inefficiency and high resources required

5 A new agile Lead User Innovation method by Ipsos and the MIT can efficiently identify the entire innovation landscape in domains of interest

6 The method uses innovation diffusion analytics to track the adoption of trends and the evolution of innovations

Read the full research paper:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3249162

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