Iterative Innovation Design Methods for Internet Products in the Era of Big data

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ABSTRACT

This paper aims to elaborate on the iterative innovation design methods of Internet products in the era of big data. Through the analysis of current Internet product iteration design practice, we examine the impact of big data thinking on Internet product design in terms of design scope, design concepts, and design methods, and we propose iterative innovation design methods relating to targeted advertising delivery, customizing users’ potential demands, and dynamic optimization of marketing promotion strategy. Finally, we discuss the advantages and precautions of using big data thinking on Internet product iterative design, proposing the appropriate advice for the development of the Internet product design.

INTRODUCTION

The concept of Internet product extending from the traditional "product", is output and used in the Internet for the management of commodity, it is to meet the Internet users needs and desires of invisible carrier. In short, the Internet product refers to the site to meet the needs of users created for the operation of the functions and services, it is the site function and service integration. What the Internet needs is fast response, rapid practice and adjustment, thinking ahead of action to make timely changes, so iterative design is necessary. Iterative design is a design methodology based on a cyclic process of prototyping, testing, analyzing, and refining a product or process. Based on the results of testing the most recent iteration of a design, changes and refinements are made. This process is intended to ultimately improve the quality and functionality of a design. In iterative design, interaction with the designed system is used as a form of research for informing and evolving a project, as successive versions, or iterations of a design are implemented.

Big data is a term for data sets that are so large or complex that traditional data processing application software is inadequate to deal with them. Challenges include capture, storage, analysis, search, sharing, transfer, visualization, querying, updating and information privacy. The term "big data" often refers simply to the use of predictive analytics, user behavior analytics, or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of data set. And this paper aims to elaborate on the iterative innovation design methods of Internet products in the era of big data.

With the advent of the Internet era of large-scale media and data sharing, traditional small-scale data manipulation practices are being replaced with big data analysis. With these changes, big data is becoming a new driving force to obtain new knowledge and
create new product value. Big data thinking refers to an ideology that considers how open data, once handled properly, can provide answers for millions of problems that need to be solved [1]. Designers can perform in-depth exploration of Internet product design through user analysis, personality customization, iterative innovation, and other development techniques, emphasizing big data techniques, in order to improve the development of Internet products.

**Iterative Design Characteristics of Existing Internet Products**

Internet products exist to provide functions and services for people’s lives. The Internet is an invisible medium whose purpose is to meet these needs. It is through the process of continuous update and improvement known as iterative design that these growing needs are met. Figure 1 shows the iterative design process of Internet products.

Iterative innovation on the Internet is divided into two primary aspects. In micro-innovation, it is left to the user’s imagination alone to innovate, from quantitative to qualitative change and constant accumulated improvements, ultimately settling upon an innovative product design. Micro-innovation pursues simple design based on a user-centered process. The purpose of user-centered processes is to improve the user experience. For example, the Alibaba company employed user research to find that China’s online buyers and sellers lack trust among one another, resulting in online trading bottlenecks [2]. In response to this pain point, Alibaba launched “security transaction” function, an early prototype of the Alipay product. The biggest difference with Ebay is that the buyer must pay money to a third party; after receipt is confirmed, the money will be transferred to seller’s account. Through a tiny innovation which solves the trust problem between buyers and sellers, Alibaba laid the foundation to beat Ebay successfully and quickly become the first one domestic C2C (customer to customer) platform, with 80% of China’s e-commerce market share, making it the leading Chinese e-commerce company. According to disclosures by China’s Ministry of Commerce, in 2013 China became the world’s largest online retail market, online shopping users reached 302 million, and the annual online retail trade volume was more than 1.85 trillion RMB, equivalent to 7.8% of total retail sales of all social consumer goods.

![Figure 1. The iterative design process for Internet innovation.](image-url)
The second aspect of iterative Internet innovation is fast iteration. Fast iteration consists of adjusting quickly based on customer feedback, rapidly integrating changes into new versions of a design [3]. To correct HP’s market stagnation, in 1999 Hewlett-Packard CEO Carly Fiorina adopted and imposed a “shoot first, aim later” product-release policy [4]. This new policy was foreign to HP executives, accustomed as they were to 95% product performance before release. Fiorina lowered HP’s legendary quality standard from 95% to 80%, spurring more rapid release of product prototypes, and this move apparently increased sales significantly. Such a process relies on rapid refinement of product prototypes that makes use of an iterative loop turning on user feedback. The goal is to satisfy users’ expectations and demands, ultimately in order to reinforce attachment and dependence on the product. Fast iteration must emphasize the three qualities of speed, precision, and immediacy. Speed refers to a rapid development phase. Precision refers to the ability to quickly identify users’ specific pain points in a prototype review. Immediacy refers to a rapid turn back from review into development without excessive delays. Using these methods to transform the best ideas into products, enterprises have greater success achieving development objectives.

THE IMPACT OF BIG DATA THINKING ON THE ITERATIVE DESIGN OF INTERNET PRODUCTS

Big data thinking calls for a new model of identifying value through large-scale data analysis. Ideally, it offers a new objectivity and rationality not always seen in the conventional design planning model. Proper design thinking is ultimately geared toward creating a supply of a particular commodity that is not merely suited to customer product demand, but ideally suited a truly harmonious combination of big data thinking and design thinking. Hence, it should address users’ urgent needs in a new and improved way.

Changes to Design Scopes

In the traditional design process, a designer comes into close contact with a limited number of users and reviews individual feedback in order to understand how to iteratively improve the design. This may be through direct observation and communication with users or it may be through careful selection and analysis of a small sample of data. Big data thinking changes this relationship fundamentally. Designers do not consider individual users’ active feedback: instead, they detect mass user behaviors through analysis of huge amounts of data, and use the mined data to guide product design.

Changes of Design Concepts

Iterative design of Internet products using big data thinking no longer relies on small random samples of data; instead, it collects all relevant data and applies user behavior analytical tools to analyze this abundance of data and build a model for an iterative design change. A crucial goal in the traditional analysis of small data is to make as few errors as possible; in other words, care is required to ensure that the sampled data
accurately reflects the population. Big data analysis, however, allows for a different conception of precision. It relies similarly on a probabilistic model; however, its huge sample reflects a different kind of inferential precision as the sample size approaches the full population [1].

**Innovation of Design Methods**

Modern information technology in the era of big data makes it theoretically possible to capture virtually any measurable datum, classify it, and post it to the cloud among like data for up-to-the-minute analysis, visualization, and human or automated response. Measurable data include users’ Internet product activity, which, when filtered through a creative thinking process aided by rich algorithms and analytical features, can stimulate actionable results that are atypical in traditional data analysis [5], and others call this “reality mining.” While analysis and management of so-called “scopic” big data flows is still a practice in its infancy [6], there are many active efforts to harness and make practical use of big data. One example of this relates to the management of environmental sensors. Practitioners are beginning to develop and negotiate open data formats and tools to view, manage, and ultimately automatically react to potentially huge and intractable quantities of sensed information [7].

**BIG-DATA-DRIVEN ITERATIVE INNOVATION DESIGN METHODS FOR INTERNET PRODUCTS**

**Targeted Advertising Delivery**

Due to its delayed nature, discreteness, and other aspects, targeting readers’ needs and interests using traditional advertising placement has always been famously difficult. Although traditional measurements include sales data, promotion response rates, market econometrics, and various other measures, advertising effect is still difficult to quantify for traditional media [8]. With the new technology, Internet marketing firms can employ cookies to capture information about users who visit their website [9]. Assuming cooperation with upstream and downstream providers, traces can be tracked throughout a user’s virtual path through news, e-commerce, online gaming and other life service. Using this traffic flow as a starting point, developers can identify target audiences in a highly focused way and custom-tailor media to each audience.

**Customizing User’s Potential Demands**

Data-driven user customization involves sorting out the mathematical connections among the multiple data flows, seeking an underlying relationship among these various channels, so as to predict users’ expectations and provide customized service. Online shopping, for example, began with simplistic advice to users for purchasing similar goods. It has since evolved to consider other data. For example, users searching for rainproof gear in areas suffering from heavy flooding may also see relevant drugs or flood-prevention tools as well. This means that one or more market analysis engines in the pipeline may be observing complementary patterns from numerous databases to produce a realistic picture of consumer need, such as local weather trends, long-term
forecasts, local events, urgent news, as well as the now-common log analysis of corresponding purchasing patterns.

**Dynamic Optimization of Marketing Promotion Strategy**

As stated above, traditional data analysis lacks many of the benefits of big data analysis. As practitioners refine the tools, the models, and the practical applications for big data, we should see further leaps in its capabilities. For marketing, this increasingly means dynamic optimization of promotional prowess. For example, online game companies still use online and hard game media as their preferred promotional channel. These media fall into three main categories: industry media, outdoor advertising, and network media. Among these, 70% of marketing budgets are spent on network media [10]. The industry can now analyze cause and effect among these multiple promotional channels to tune their marketing strategy. In fact, through reality mining, discussed above, and new psychosocial network analytical frameworks called “honest signals” [5], paint a future in which big data not only can model in real time, but can actually predict trends far into the future.

**ITERATIVE INNOVATION DESIGN STRENGTHS OF INTERNET PRODUCTS UNDER BIG DATA THINKING**

**High Efficiency**

The Internet has brought much wider participation and rapid change. This continuing development has led to efficiencies in the areas of data management and iterative design of products. Increasingly, this is based on big data decisionmaking, which exactly corresponds to three features in the rapid change of Internet products – speed, precision, and immediacy. Using big data thinking to make iterative design has been critical both in terms of solving customer needs and cultivating user loyalty.

**Economy**

Research by McAfee et al. found that the companies that make strategic decisions using big data were 6% higher in average profits than those using traditional methods for making decisions [11]. Successful companies are using big data thinking to make iterative product design based on data analysis and identifying innovation points, then making predictions as well as business decisions. They then build market share by means of these rapid maneuvers. For example, WeChat’s Red Envelope concept adopted the traditional Chinese festival-time giving friends red envelopes with modest amounts of real money. WeChat transplanted this into an Internet product, and made continuously iterative improvements, which ultimately helped Tencent realize a substantial economic benefit. Figure 2 shows the relationship between the number of WeChat red-envelope participants and different festivals. We can see that during the six months of 2016, red envelopes active users increased from 40 million to 100 million in Figure 2. It's a good illustration of how iterative design works for products.
ITERATIVE INNOVATION DESIGN CONCERNS OF INTERNET PRODUCTS UNDER THE BIG DATA THINKING

The advantage of big data lies not in its enormity, but in its utility. Big data analysts practitioners must come to fully understand the value of the data and how to use it for decision-making and, in turn, value creation [3]. However, an appreciation of the power of big data must be balanced by an imperative of good design. On design, Steve Jobs famously remarked that, “A lot of times, people don’t know what they want until you show it to them” [12]. This reinforced the public’s belief that Apple in its arrogance did not rely on user opinion. On the contrary, Jobs and Apple did in fact rely on market analysis, although he treated designers’ subjective initiative as far more important than at most companies. Correct use of big data will strike a balance with other sources of innovation knowledge. Otherwise, there is the danger of falling into a quagmire of machine-made decisions that displace the human element [13].

For years there have been concerns afloat that users are surrendering control of information that was considered private just a few years ago. Big data pioneers are going further, making surprising presumptions and yet also sweeping concessions about individual data sovereignty. This revolution in information exchange in the big data era is bound to lead to progressive change in privacy norms. Alex Pentland has argued for a “New Deal on Data” that is being carried out as a kind of bill of rights both in the U.S. and Europe [14]. The regulation and ethical application of data is crucial. Data managers and regulators share responsibility of maintaining control of data, through monitoring data collection, storage, use, and all other aspects of its custody.

CONCLUSIONS

The most critical step in the move to big data thinking is a transition from more familiar, natural, and concrete thinking processes to advanced, abstract modes of thinking. What elicits the true power of mass data is an ineffable creative visualization process essentially the insights that we see coming not from the data scientist’s mind, but from that of the artist. Big data’s impact on design of Internet products is already significant design thinking and changed the design method. Data can explain the past,
drive the present, and rule the future. Designers need a mature sense of the pros and cons of big data. They must ascertain big data’s proper place in the design world, judiciously integrating big data thinking and the iterative process for arriving at new designs.

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