Design Trend Research for Building a Future Physical-Cyber Ecosystem

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Abstract. China, now the world's second-largest economy with a massive user crowd, there is a surge growth of mobile internet business, products and users. Every year, numerous of new companies and products are incubated or landed in this market, some of them made huge success, and lots of them failed too.

To those who including companies and individuals invest in this market, they want to find some patterns, design trends, inspiration, and more importantly, to find some leads to the successful future design innovation. They need a better reference and more powerful design cards in hands during the process of creation. However, neither the design trend nor creative ideas are tangible. They are abstract. We all as users can feel mobile products are offering an easier and more and more comfortable user experience to attract users to love using these products. This sensitive cognition is the premise and base of designer's creative learning activity, but it can't be a reliable reference of the next generation of innovation.

Where the design trends are now and where the future design innovations are will be presented in a more tangible way. We need two steps to achieve that.

First of all, we need to find out what design trends are based on the studies of what just happened in mobile product design field. This is about seeing and understanding design trends in a narrow level.

From the most popular mobile platforms like Android, iOS and Widows Phone, top-ranking applications listed as our research object, to the major iteration of applications, with the purpose of summarizing design trends, we built a research model with two study dimensions. The research of the horizontal dimension, which we call it the Combing System, focuses on the design evolution of applications by studying 21 general task-flows and some particular task-flows we defined, as well as the evolution of style guide of platforms themselves. Each task-flow is given a representing color sequence which not only helps us to represent research data in a visualized way, it will be convenient to observe one particular flow from others more clearly in the visualized data map. We can see from our visualized data that which flow the redesign of different type of applications is focused on. The vertical dimension, which we call it Stamping System, focuses on the research of the major iteration of applications. Unlike dyeing different task-flow in the Combing System, we trace every task-flow, so we can observe how the design of each flow changes from the previous form into the latest one by comparing the trace of task-flows of the newest and the previous version of an app together in a visualized data map. More

interestingly, this research model can also help us to observe how one platform's style guide including UI and GUI style can affect each other.

Secondly, we relate design trends we summarized with major trends of development of Chinese social context, because isolating design trends research from their social context would be meaningless and pointless. The other reason to put the consideration of Chinese social context in the research system is that it is changing frequently which cause the more complex scenario and user needs.

After relating design trends and social context together, we now need to learn from the process of the creation of classic design by fully understanding offering better user experience design does not only exist in high technology time. We should realize that the reason why classic design became classic design is not only about creating something new successfully, it is about combining different things that already existed to provide a better user experience for the most of the time. Radical design takes years to succeed and most of them failed. Future creation will not all incubated in the rocket high technology labs, we can not just count on that to innovate, most of them will be created by combining different things together to provide a better user experience like how classic design succeeded. We can search for new possible combinations in this bigger picture consists of design trends and their social context, and this also can help us to understand how to build a harmonious physical-cyber ecosystem for both products and users who will use them.

Besides a tangible way that we can tell where the design trends now are and where the future design innovations are in the bigger picture, the physical-cyber ecosystem, we also have some advices for designers: keep searching new possible combinations in the ecosystem to fix problems with better user experience, not just think of yourself as problem solver also the problem seekers. Don't be afraid to put your product in the market once you see a new potential connection. Only these can make us keep creating and innovating.

Keywords: UX, Design, Trend, Research, Innovation.

1   Project Background

Today in China, there is the most rapid growth and development of mobile internet business and products with a largest body of users. Mobile platforms have integrated many important aspect of people's everyday life such as lifestyle, entertainment, social net-work into a portable and personal device. There are many traditional business are attempting to develop products based on mobile platforms: many hospitals are building mobile HIT system in a large scale, and pharmaceutical enterprises are founding their own information management system to help themselves, some of whom might based on a remote area in China, reach out to most advanced drug labs all around the world and cooperate through mobile platforms.

With the purpose of achieving successfully, there is no doubt that we need to design mobile products with positive basic user experience elements. Nonetheless, doing well on basic elements can not assure the success when dealing with the most complex body of users and the rapid changing usage scenario. Besides, Major

platforms are offering a better environment to encourage the innovation with more open resources and flexibilities. The situation requires every developer to be more innovative to survive. Innovation can bring more functions and surprises to satisfy the user needs, and it will support the sustainable development of products themselves accordingly.

2   Our Research System

2.1   Overall Introduction

Innovation is an abstract notion, broadly speaking, it can refer to many process. In UX field, innovation reflected in users' feelings and comments. People can sense that mobile products are getting more easy to use and their lives are becoming more convenient because of some new function or a more convenient operation these products provided. However, these feelings, comments and even an emergence and vanishing of concrete functions, can't represent innovation in UX design in a very systematic way. We need to summarize key words of innovation and trend in the design progress thorough research in the recent past, put research result in the background of Chinese social context developing and changing, and by then, we can be indicated from that bigger picture where the ways of near future design innovation are.

With the purpose above, in 2010, we began to build our design research system by studying the evolution of most popular mobile platforms such as Android and iOS. And in 2012, we expanded our research range from platforms only to the most active apps.

Summarizing of the recent past is our first step. We research the newest system version of popular platforms including Android, iOS and WP. Then, we track down and research those top-ranking apps[1], both domestic and international. For example, based on the study of Android 4.0, a system version that is taking more and more system market share of Android, we track down top 5 apps in 11 different download categories.

The research of apps has two dimensions. The horizontal one allows us put all the apps in the same download category together, deconstruct them into separated task flows, only observes and compares the 21 task flows we defined. The vertical one helps us to track down the upgrade of each app by comparing its older version with the newest version.

We can imagine the horizontal research dimension as the Comb, and the vertical one as the Stamp.

2.2   Horizontal Dimension Research Method and Discoveries

Every gap of the comb represents a task-flow. There are basic and particular task flows. We defined 21 basic task flows in the past studies. Though basic task flows are

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[1] Ranking Data from App Annie.

defined in our research system, they are universal task flows that every app would have. For instance, basic task flow 1 focus on the registration, login and logout, and basic flow 2 studies information architecture including navigation and search. From the observation of every task flow, we classify features into 5 categories–popular UI, particular UI, popular GUI, particular GUI and function. Comb, the horizontal research dimension, enables us find the design trend of one particular type of apps in the macroscopic level.

Furthermore, we give every basic task flow with 5 color of the same color scheme to represent 5 observation categories–popular UI, particular UI, popular GUI, particular GUI and function. 21 basic task flows have 21 color themes–this is inspired by what bioengineers do to distinct one DNA sequence from others. The horizontal research dimension is all about the deconstruction. In this way we study the overall trend other than specific design details, which will be fully studied in the horizontal research dimension. Any spotted change of design will be marked and become an abstract color block in the visualized information map, and the details of changes will be described in the separated report.

In Fig. 1, the visualized information graph, RED represents tasks like New Features Introducing, ORANGE represents tasks such as sign up, login and logout, BLUE represents information architecture design such as navigation, search and tabs, PURPLE represents tasks related to account settings, TURQUOIS represents tasks connected with system settings, VIOLET represents bookmark related tasks, GREY represents upload and download tasks, and PINK represents particular tasks such as recharges.

UI, Popular									
UI, Individual									
GUI, Popular									
GUI, Individual									
New Function									
New Features	Sign Up Login Logout	Information Achitecture	Information Management	Account Settings	Systerm Settings	Bookmark Settings	Upload Download	Individual Procedure

Fig. 1. Color themes in the horizontal research dimension studies

With these color themes, we drew the diagram of design change trends of 2013 (2-2). In this image, from left to right, each group of color blocks represents one type of application–Finance, Social Net-working, Lifestyle, Communication, Travel and Local, Video and Media, Audio and Music, Comics, Tools, Reading and shopping.

Now we can see clearly, that developers of different type of application all put the upgrading emphasis on the information architecture design. Especially the design of shopping applications, a more easy to use and hierarchically clear information system, like navigation and searching, is crucial.
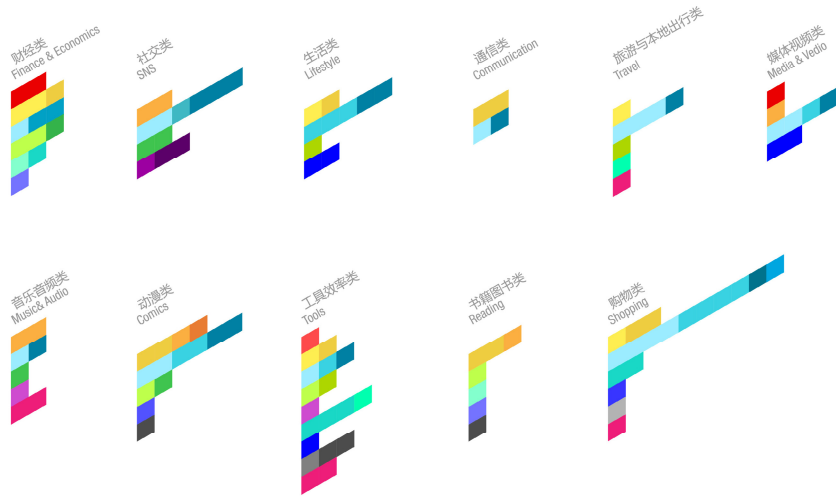
Fig. 2. Different types focus on upgrading of different task flows

The horizontal research is not only suitable for summarizing and studying overall features of different task flow design progress, it is an optimal way to observe the platform evolution. We marked elements with strong Android 4.0 features with GREEN in the same visualizing map, and elements with strong iOS styles with BLUE. We got the diagram (2-3) below.
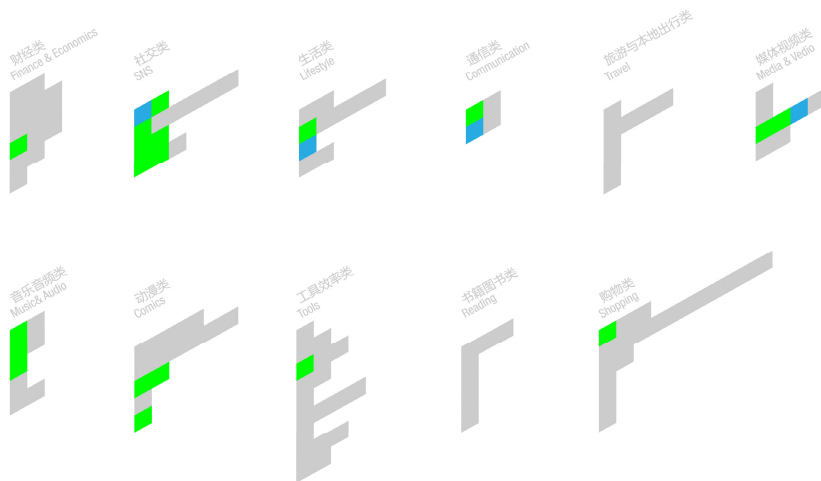

Fig. 3. SNS applications are influenced by Android 4.0 style the most

From where GREEN spots are in image 2-4, we can perceive that features of Android 4.0 impacted the design of UI the most. 16% of UI design upgrading is caused by adopting Android 4.0 controls, and less than 3% features are inspired by iOS UI styles.
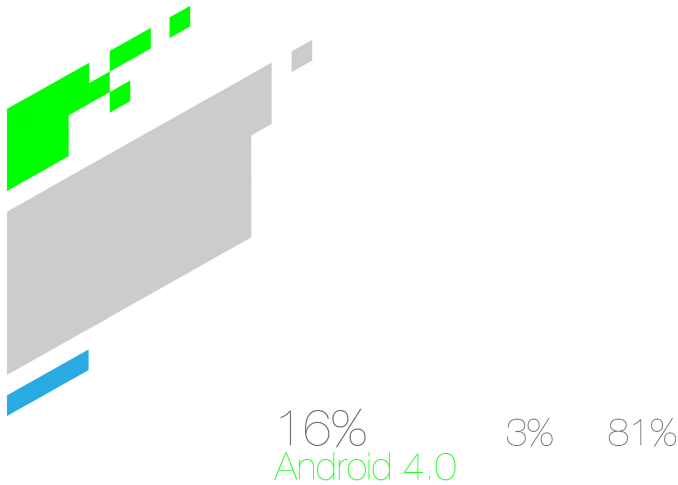

Fig. 4. Android 4.0 features vs. iOS features in research result

Among all the application types, the category of Social Net-working is one type that adopts Android 4.0 features the most. Known from the past, design of social network applications is leading the design progress in many aspects.

And what controls are being adopted most in the design upgrading since Android published its 4.0 version? Seen from the visualized information map, control like Swipe Between Taps is one of them.

Control of Swipe Between Taps is appeared after the Window Phone system was been published, and iOS style, which is influenced by Metro UI apparently, is showing less power to influence Android since iOS 7. Interestingly, what we found is not about which platform is better than the other, it is about they being more universal. This can also reflect the design trend of being seamless when dealing with cross-platform.

2.3   Dimension Research Method and Discoveries

Stamp, the vertical research dimension, allows us overlay two or more "stamp pattern" together to distinguish different features. These differences reflect innovation updates.

We know that whether through log files or user tests, we can trace the path how a user accomplishes one task visually. We trace at least 3 task flows in one version of an application, one or two of them is the core task flow of this app, and the rest are sub-core ones. When overlay the trace of an older version with the one of newest version, we can distinctly perceive the change in the newer version and how the change has been made when compared with the older one.

Stamp, the vertical research dimension, enables us find the more obvious and concrete evidence of innovation in UI, GUI and function throughout application upgrade in the microcosmic level.

Diagram 2-5 below shows an example of how we comparing two different version of the same mobile application. In the newer version, it reduced the steps what a user needs to accomplish its core task flow. And furthermore, it weakened its sub-core function by moving the entrance from the index to a Sub-page. Less operation steps and one strong function, this leads us to the trend of designing Dumb Products. Designing Dumb Products is not conflict with design trends we concluded through the horizontal research, the seamless cross devices and platforms. Dumb products can not exist alone, they have to work with other products in a bigger user-product ecosystem.
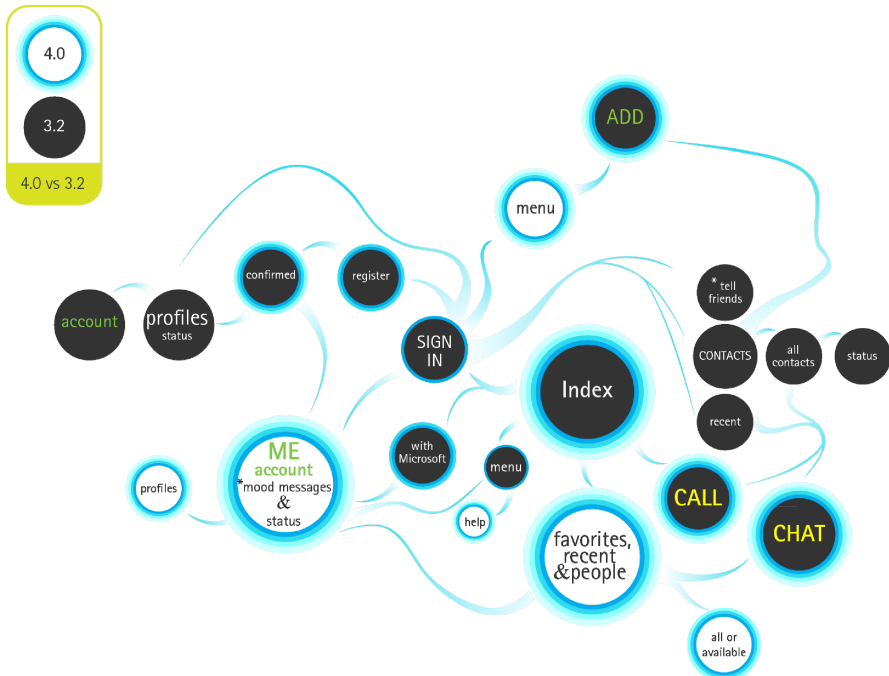

Fig. 5. Task flow paths comparing between the older and the newer version of a study object

3   Research Discoveries, Social Context, and Future Physical-Cyber Ecosystem

3.1   Design Trend and Future Innovation

However scattered information can not be enough to be referred to draw a bigger picture to see where future design innovation goes.

User experience and design innovation does not only exist in mobile-internet era.

When think of innovation, designers should not rely on or put the focus on finding new technologies, instead, look for new connections and tie different things together to create new user experiences. Donald Norman said in a 2013 User Friendly Conference in Shanghai, China, that radical design takes years to succeed, and most of them failed. Learnt from the creation of classic design, it is mostly about establishing new connection between two already existed things to bring users new user experience, it is are not about creating from nothing. For instance, pens and clips exist for years before someone connected the two together to make it become more convenient to use, to pin to your pocket or book.

Nike Fuel Band connected three already existed elements together–the technology supports it, sports wear, and people's awareness of being health, and made a new user experience. And it was just 10 years ago, when talked about Nike, people only described it as a sportswear company not a high tech one.

Today, with all the technologies to support mobile product design ready, all we need, is find more new connections between different things.

3.2   Physical-Cyber Ecosystem Built with Design Trend and Social Context

Our research system helped us conclude trend key words, and we put these key words in the Chinese social context to find possible connections between different things. Though the GDP of China is not ideal but there are surge growths in mobile business and products, like online and mobile shopping, mobile financing, logistics and so on, many big international companies built their research institutes or centers of big data in China including INTEL and EMC. Meanwhile, social conflicts like aging of population, environment, education and medical resource problems are significant. All these are consisting Chinese social context.

We can see lots of potential connections when we put design trend keywords together with social context in illustration 3-1. Also, this illustration is an early model of how the future physical-cyber harmonious ecosystem will look like. We create products by building new connections to create new user experience, and the reverse will also be true that products will offer the right user experience since they are inspired by the ecosystem.
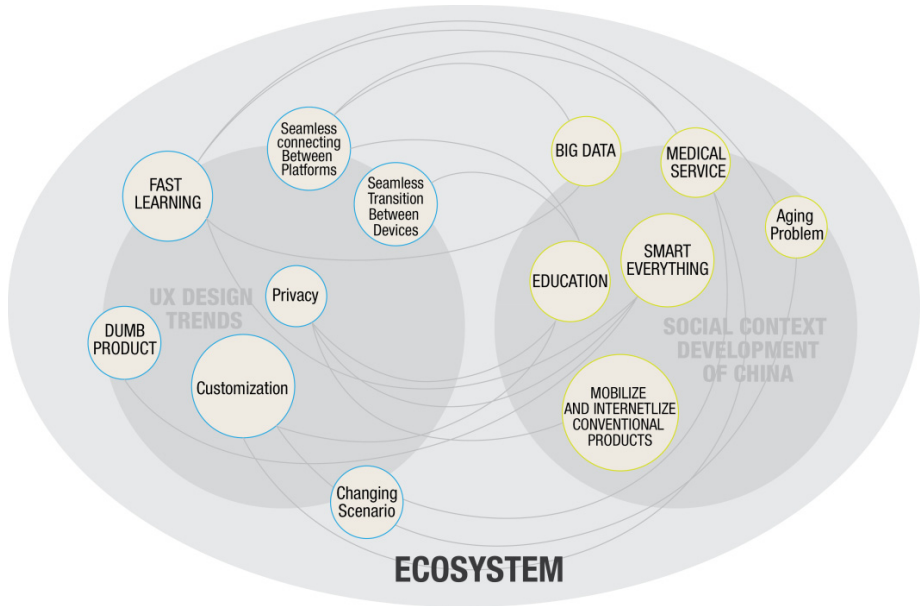
Fig. 6. An an early model of future physical-cyber convergence ecosystem of China

4   Future Research Prospect

Our research project is not on going is a very long time span. If we keep this research project on track for years, and if we put our study in a much longer timeline, we can perceive more evidence showing how design is influenced by social context at that time like popular ideological trend, consumption custom and usage scenario. Observed from history, design trend repeats itself, and reprograms itself under the influence of certain social context. In the future, when some patterns of social context appear, we can predict design tends in some ways accordingly.

With the design trend, and when there are new connections, it may be the best chance to innovate. Reid Hoffman once said in an interview that if you're not embarrassed by the first version of your product, you have launched too tale.