Infosys Opinions

Advances in User Experience Design
Infosys set up Business IT Services (BITS) with a primary focus on helping our clients in their optimization journey. The journey of optimization enables our clients to do more with less by stretching IT budgets, spend smarter by shifting spend to fuel growth and finally enhance value from IT through superior customer experience.

The group comprising of 60000 Infosys personnel spreads across Application Services, Testing Services and Infrastructure Services that has a rich heritage of experience based on serving 600 clients for more than 30 years. A need was felt to capture this rich heritage of experience and thought leadership and share it with a wider audience resulting in the birth of the Infosys Opinions journal. Infosys Opinions is a quarterly journal and will focus on different aspects of optimization and client value enhancement.

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Welcome Note

Dear Readers,

As you flip through the first page, Infosys Opinions is born. Welcome to the very first edition!

Your patronage and participation brings us a lot of joy and hopes for creating a vibrant ecosystem in Business IT Services (BITS). At a time, when change is the only constant, there is still one thing that hasn’t changed, the need for optimization. In fact, the need is more important than ever before. We promise to bring optimization to you through a collection of papers written by our thought leaders, technologies & trends that support better optimization, user adoption and delivery of superior business value. Infosys Opinions, our quarterly journal will be a collection of some of the best reflections and commentaries from our experience, research and collaborations with our clients and partners.

As leaders and innovators in the outsourcing space, we will bring in fresh thinking around a different theme in each edition. With the advances and evolutions continuing to happen in BITS, this effort will help nurture, mature and evangelize the theme of optimization. This journal will provide a platform for authors and readers of technology and business, to echo their passion that has motivated them for years and will now come alive with their participation.

No meeting is usually complete today without a word on user experience and usability. Over the last few years, UX has emerged from the backroom to the boardroom, going from something that's nice to have, to an essential element of successful products that give meaning to our lives. We felt that it would be appropriate if we dedicate our first edition to User Experience (UX). With the UX COE getting established, a number of things are coming together that will help us leapfrog and we believe this edition of Infosys Opinions covering UX will strengthen our effort even further. Your effort and contribution, either as a reader or as an author, is truly appreciated. Through Infosys Opinions, let's meet and interact, exchange notes and spread the wisdom to others.

Enjoy reading!

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User Experience: The Key Business Differentiator
By Rajesh Thampy

User Experience and Mobile Commerce
By Pankaj Agrawal and Jigar Gohel
Penetration of mobile to the remotest corner of the world has opened up a whole new world for business. Buying decisions and transactions on mobile are catching up fast and it is of utmost importance that businesses think from the perspective of UX to lend mobile users a supreme buying experience, claim the authors.

User Experience in Building Tomorrow’s Persuasive Healthcare
By Soumava Mandal
Healthcare is a sector that has immense responsibility toward life and experience. Technology and well-conceived UX design can be great enablers in creating a resilient ecosystem to provide better care to patients.

Security Concerns in New User Experience Enhancing Features of HTML5
By Krishna Chaitanya T and Harigopal K B Ponnapalli
The new web experience has an array of exciting features but it is not devoid of security issues. The authors focus on security measures to mitigate the risks and make user experience safe, robust and pleasurable.

UX: The Real Differentiator in Consumer Banking
By Narayanan Venkataraman and Anil Radhakrishnan
Consumer banking world is witnessing a mad rush to retain and attract customers. A personal touch in user experience can be the much required differentiator to be the leader in the competition, say the authors.

UX Design Patterns to Guide BI Dashboard Design
By Chandan Gokhale and Kris Sriram
Business Intelligence (BI) dashboards have grown to be indispensable tools for business analysts. An effective dashboard can only be developed when user experience is woven into the design of the dashboards at the conceptual level, assert the authors.

User Experience across Cultures: A Study
By Vijay Swaminathan and Mukta Kashyap
Cultural differences add variety to human life but the diversity also makes it difficult for businesses to grow. A thorough understanding of cultural nuances is imperative to create UX design that can connect to people in an effective manner.

UX: A Critical Success Driver for Social Media Growth and Brand Optimization
By Jigar Gohel, Pankaj Agrawal and Vilojan Daniel
Social media is emerging as a vibrant business platform and leading brands are leveraging networking sites to build brands and connect to customers. User experience is a key component to attract new customers and retain existing ones, believe the authors.
User Experience: The Key Business Differentiator

Today’s businesses are extremely complex against businesses a decade ago. The complexities exist and grow not only in terms of scale, size and reach but also in terms of global and social connectivity, security, compliance, sustainability and so on. Technology innovations and advances have enabled corporations to meet these challenges to a large extent and technology continues to enable businesses at a pace that outwits our imagination.

Successful businesses are those that have entrusted great significance on people’s ability to connect with technology and in turn their ability to connect with the brand. User experience of products and services that businesses offer is thus extremely important for the success of a business. Creative and innovative user experience can redefine how a product is perceived, used and evangelized. It can help build trust with the brand and enhance advocacy.

User experience design services today help organizations build products and services that engage users in a more meaningful manner. User experience consulting becomes critical in the context where availability and access to technology is a given but differentiation is the key. Investing and implementing creative and innovative experiences in the design and development process will define product differentiation in the marketplace. A few scenarios that lay emphasis on the significance of User Experience Design services are discussed here.

Ubiquitous UX
As computing becomes ubiquitous and pervasive, technology integration has become a part of people’s lives more than ever before. People are socially connected and at the same time engaged in work and fun related activities. This calls for a seamless user experience that allows users to connect and engage intuitively and be able to manage and perform their multiple roles and daily chores easily. For example, personalized mobile banking for people on the go or using augmented reality to check the weight of a parcel that needs to be mailed can have lasting impressions of the brand or business on the user.

UX Differentiators
As businesses adopt standard technology platforms and solutions to build or host products and services, the differentiators will clearly be the creative and innovative business propositions and the user experience delivered. Android, for example is considered to be the most popular mobile platform and is widely used by manufacturers to deliver applications on a variety of devices. User Experience thus is extremely critical for user adoption and enhancement of market share and to ensure differentiation.

Design-led Innovations
Design-led innovations not only help businesses to create compelling products and solutions that provide competitive advantage but also help to create new opportunities for growth. Apple is a great example of how design-led innovation can create new markets.

In the ever changing business and technology landscape, user experience led transformation will provide tremendous value in terms of enhancing human productivity, establishing new ways of working and leveraging technology for a better life.

The first edition of Infosys Opinions focuses on User Experience, strengthening our belief that a greater impetus on UX will enable us to deliver superior products and services to our clients. The experiential observations and viewpoints shared in this journal are insightful and valuable. UX and its relevance to pertinent industry verticals and domains are well represented making this journal a must read for UX aficionados and business leads. We believe this experiential knowledge will benefit readers immensely and open up deeper conversations and strengthen our efforts in differentiating our products and services in the market place.
Has it been sometime since you visited your bank for a transaction? Do you find yourself banking more on mobile? It is no wonder that mobile phone penetration and changing consumer preferences are driving the banking and payment industry to move rapidly toward mobile commerce. Increase in processing speeds of smartphones, increase in mobile internet access speeds for 3G/4G networks and availability of other enabling technologies like Near Field Communication (NFC) has led to the availability of innovative solutions in mobile payments. Some such instances are Google wallet and PayPal peer-to-peer (p2p) payment solution. Consumers expect a simple, secure, quick and enjoyable user experience provided by various innovative mobile commerce solutions. Such user experience (UX) is now available on smartphones and tablets like iPad, NFC used in mobile wallet, direct carrier billing like BoKu and Zong or mobile as point of sale like Square. According to a survey, mobile commerce volumes will reach $670 Billion by
2015 from $240 Billion in 2011 and around 40% of the respondents believed that user experience will be the most important factor in the development and growth of mobile commerce and mobile payment solutions [1].

Mobile commerce (M-commerce) is one of the fastest growing segments within the banking and financial world. Alternate payment providers have rolled out mobile wallets and P2P solutions using the NFC capabilities. Mobile operators are venturing into mobile payments via direct carrier billing solutions like BoKu and Zong. These digital transformation initiatives are being made possible due to software widgets residing in smartphones. Today, consumers prefer receiving their statements, bills, receipt and memos instantly on smartphones rather than on paper or SMS format. Financial institutions and retailers are also focusing on going green to be more socially responsible. It is also predicted that these digital payment solutions will help in displacing cash in small ticket transactions like paying a friend, bus ticket or for a taxi ride.

User experience in mobile commerce is the way a consumer feels about using mobile devices like smartphone or tablets to make any purchase, transaction or payment. Smartphone is an essential commodity for a large set of population today and tablet sales are driving the electronics market. As per 2011 data, tablet and smartphone sales is outnumbering desktop PC sales and is expected to continue growing at an exponential rate [2]. Smartphones and tablets not only serve as communication devices but these have also become essential items for gaming, entertainment, news, surfing, chatting and connecting to social media. Smartphones and tablets are increasingly becoming preferred choice of trade and commerce for consumers as payment and transaction can happen anytime from anywhere.

Mobile commerce providers are aware of the fact that initial user experience is vital for the success of any mobile commerce application. At the same time, as they gain customer preference through tablets and social media, they are trying to stay relevant in this digital transformation journey. For a great user experience in any mobile commerce application, three things are of utmost importance:

- **A smooth workflow:** It defines how easily a user can use mobile for banking and payment. For instance, if a user wants to use a mobile application or purchase anything then she should be able to conveniently navigate through all the steps involved in the transaction without much hassle.

- **Interactivity:** User experience should be created in such a way that it should engage the user interactively until the completion of the transaction. The reaction of the mobile commerce system to the user's actions should be fast and intuitive to be able to engage the user till the completion of the transaction.

- **Availability:** Availability is the most critical factor in the success of any system. A user experience which is made available by using factors that
are not widely available is bound to fail. For instance, internet is required to make a transaction but internet or 3G/4G services may not be widely available in remote areas.

UX: A Critical Driver for M-Commerce

Today smartphones and tablets are ubiquitous and loaded with multiple features and applications. It is important that these devices provide easy, convenient and affordable shopping experience to users when it comes to m-commerce. In other words, consumers want their experience on m-commerce to be easy, pleasant, useful and quick.

Easy: Usability refers to the ease of buying or making payment using mobile device. Initial experience with the mobile payment application will ensure the customer's impression of the application being effortless or otherwise. If the user finds the application to be easy, she is more likely come back to it. Usability depends on two primary factors.

- **Device:** Qwerty or ordinary keypad, resistive or capacitive touch screens, screen size and resolution, color pixels, battery life, etc., contribute to good or bad user experience vis-à-vis m-commerce.

- **Operating System (OS) and Applications:** Most mobile phones have Android, iOS or Windows operating system as these operating systems have many applications. Some applications are OS specific and thus consumers have to check before using it on their phone.

Pleasant Experience: Bill payments and financial transactions are routine and monotonous tasks that need to be done at regular intervals. Mobile devices offer to make these payments and transactions easy. To make the experience pleasurable, UX features can be designed in a way so that consumers enjoy using payment applications through mobile devices. Thus, UX can make m-commerce a pleasant experience for consumers.

Useful: This component contributes to the customer's perception of the application being useful to help the customer perform better. If the user perceives a particular mobile payment application to be cashless, hassle-free and quick, then the probability to accept the application is obviously more.

Quick: In this age of digital transformation, consumers typically use multiple services that require monthly or weekly payments. As discussed earlier, this is a monotonous task that a consumer has to remember and pay periodically. M-commerce provides the facility to make payments over air and UX can be a deciding factor to choose applications. UX can help building functionality or applications that consume less payment time on air.

During the last holiday season, Google had projected that over 44% of gift and store related searches will take place on mobile phones [3]. Given this scenario, m-commerce is bound to emerge as the ultimate shopping tool as smartphones increasingly penetrate the larger population. Therefore, retailers have to understand the importance of UX to create strong and personal shopping experience. Consumers are apprehensive about security of personal information that is shared with retailers during transactions. A good UX will help in building relationship and confidence. Retailers can further leverage this relationship to know geographical locations of customers to be able to provide location and behavioral based offers and products.

UX and M-Commerce Methods

UX also depends on the choice of m-commerce mode. Retailers/merchants can develop a separate mobile application for shopping, for e.g., Amazon has its own mobile application.
The retailers may also create an optimized website that is suited for mobile phones or a regular web site, i.e., an e-commerce website can also be maintained for m-commerce. Table 1 shows three modes of mobile commerce.

Mobile applications are specifically designed for mobile devices like iPhone or android phone. These applications are designed for small mobile device screens and thus pictures, font size and animations are adjusted to provide good UX and a high speed of access. Like American Express UK has developed an application for iPhone and android phone. This application helps the consumers to make online payments, check balance and download statements with ease.

Some sellers and online retailers have created their own mobile optimized site which is almost like a normal website. However, the content is designed to suit small screen mobile devices. Thus, the sites provide relatively better UX to consumer than accessing regular website through GPRS/internet. The advent of HTML5 has made mobile optimized web surfing experience close to e-commerce.

**Challenges for UX in M-Commerce**

According to a study, 54% of smartphone users and 61% of tablet users said that they find mobile applications and websites ineffective and difficult to use for payment and transactions [4]. Thus, with all supporting technology, infrastructure and market, the challenge for m-commerce lies in a smooth user experience.

M-commerce faces the following challenges:

- Mobile devices do not provide appropriate interfaces to access content on web. Their resolution is also very small; typically in the range of 1024x768 even for small phones. It is very less compared to desktops and laptops.

- A Google survey says that 61% of users do not like non-optimized sites [5]. Thus, it is a challenge for brands/retailer to create one for better UX.

- During online payments, it is difficult to type credit card numbers even on smart phones.

- Security is a major concern. M-commerce typically happens outdoors and in public. So, the details of the card or other private information can often be seen by others. Also mobile device contains a lot of personal information and a loss of mobile data could lead to identity theft.

- Customers want personalization or customization in every aspect,

<table>
<thead>
<tr>
<th>Mobile Application</th>
<th>Mobile Optimized Website</th>
<th>Regular Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>Application developed for a specific purpose. Device specific and to be downloaded from market place.</td>
<td>Specialized website for small screen on handsets to suite its design, pages, links, etc.</td>
</tr>
<tr>
<td>Usage</td>
<td>A retailer can engage and transform the customer from occasional visitor to a loyal customer with the help of m-apps.</td>
<td>User need not download anything. Web content will be automatically formatted for suitable viewing in that device/platform.</td>
</tr>
</tbody>
</table>

*Table 1: Modes of Mobile Commerce*

*Source:* Infosys Research
including payment mechanism. Providing personalization feature for m-commerce is a challenge.

**UX Features for Growth of M-Commerce**

M-commerce is a fast emerging concept and lifestyle. Today, consumers spend very less time in making purchase decisions but nevertheless, they still want to know about all features and offers on the products before making a final decision. Some desirable features for an enjoyable mobile shopping experience is listed here:

- **Appealing Interface:** User interface should be simple, comprehensive and appealing on smartphones and tablets. Since mobile screens are very small compared to desktops and laptops, the home page should convey the brand/selling product with ease. A customer usually wants to see the product from all possible angles because that is the best she can do without touching a product. Multiple and large images with features like zoom make user experience interactive. Some of the advanced features include dynamic resizing, 360 degree spin, comparisons, etc. The page should also have detailed information, proper font, color, size, price range, etc.

- **Identity and Data Security:** Security is a major concern for consumers when they use mobile devices for transactions. UX features like data encryption can play a very critical role in securing transaction data and information exchange between mobile devices and network providers. Use of next generation payment methods like virtual currency will also ensure that consumers do not need to enter card details frequently. Consumers can buy virtual currency in chunks and can later spend as per their convenience. Facebook has already entered alternate payments solutions via its virtual currency called Facebook Credits. Secondly, smartphones and tablets contain a lot of personal and confidential information including card details and payment history. So, a theft of a mobile device has the potential of identity theft. Ensuring proactive solutions for these will be a welcome UX feature for consumers. Also, data lost feature can be introduced to secure a mobile device from tampering.

- **Optimum Design:** The consumer's initial reaction on web design is very crucial as that becomes the deciding factor for the consumer to go to the next steps of searching and buying. Product search (keyword) and navigation (moving from category to category) tools should lead consumers to the desired product in minimum clicks. Ideally, search and navigation should be part of the home page from where the consumers can reach the desired product quickly and seamlessly with the help of filters. Also, the location-based services (LBS) may aid in locating nearby stores/ATM, etc., required by the customer.

- **Personalization:** Personalization has become an important attribute for users in today's digital world. Users want their web page personalized and no two users have the same viewing preferences or payment methods. Some of the major m-commerce sites like Amazon, PayPal and eBay require just PayPal username and password to make payments. Since card and banking details are already saved with PayPal, it makes transactions easy for users. Similarly, the P2P payment solutions requiring only email addresses or mobile phone numbers are growing popular.
Conclusion

It is a common observation that mobile users want optimized website or mobile application for better user experience and faster access while performing m-commerce. An intuitive and convenient user experience is the key to the adoption of any technology. Although m-commerce strategy can vary from brand to brand, the most important factor is to connect to users, identify their needs and provide services keeping user experience in mind. This is how one can build unique and committed customer base and drive the growth of m-commerce. Useful, pleasant, desirable, comprehensive and quick UX can drive win-win situation for retailers/merchants and consumers for m-commerce. M-commerce has the potential to become the next big thing in banking and payments industry with enhanced user experience through evolving mobile technologies.

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It’s 7 am in Mumbai. Rahul is all set to leave for his office. Suddenly he feels uneasy and his intelligent clothes tell him that something is wrong in his lower abdomen. He immediately takes a smart digestive pill with ingestible event marker that monitors all his physiological parameters and sends the report to Dr David, his family physician. Dr David goes through all data in real time and remotely examines his abdomen with his virtual holo-haptic monitor with his fellow experts in John Hopkins Hospital and suggests immediate gastric bypass surgery. Later, doctors successfully cyber-operate on Rahul with the help of a humanoid shadow hand.

Is this the trailer of a sci-fi movie? While it does seem so, technology is evolving so rapidly that this figment of imagination is likely to be true in the next ten years. Tomorrow’s healthcare service will be empowered with collective intelligence and will be connected through an inclusive borderless healthcare experience.
Healthcare Services Today
Inconsistent quality and cost of healthcare services and poor accessibility to medical information failed to gear up to the concept of universal healthcare services. The primary challenge to reach out to the larger population is to fuse mobility and accessibility of information. Easy access will make the consumer better informed and self-reliant through self-help measures. This will also allow the consumer to leverage the ecosystem created around medical services and the emerging economy. User experience (UX) plays an important role to empower this patient-provider relationship. When experience based information is super-imposed on scientific raw data, it can create empathy in the patient-provider relationship. A smart layer of usability and emotion on top of technology reduces the cost of support for services and operational time and expenditure; this in turn impacts the entire business process.

Extensive technological innovations have taken place over the last few decades in the healthcare sector. But the diffusion of innovation gets diluted due to unorganized implementation and the incapability to blend between high performance and human empathy. The aim of this paper is to identify various gaps in healthcare business and suggest ways to blend technology, innovation and user experience.

From Mainframe Healthcare to Health 3.0
The medical community in the early eighteenth century moved out from a holistic approach toward healthcare and began to categorize and specialize on different parts of the body. This shift in focus was reflected in medical education and architecture. Specialized healthcare system evolved and the focus moved from the entire human body to specialization of individual parts like cardiology, orthopaedic, neurology, etc. In the early 21st century, Andy Groove and Eric Dishman coined the term Mainframe healthcare [1].

The mainstream healthcare system is still based on a robust yet enormously expensive mainframe system. As a result, the common man finds it very difficult to afford quality healthcare. This problem takes a centre stage in the American healthcare system. 41% of the working American population are unable to afford insurance and this number is increasing alarmingly [2].

A large chunk of population could not afford the mainframe healthcare system and thus an alternative patient community called e-patients evolved. Peer-to-peer healthcare gained popularity due to easy access to colossal information on internet and Healthcare 2.0 was born. Today, internet not only links pages but semantic web technology also helps information to be fused with metadata to increase searchability and strengthen crawlers’ ability. The paradigm of healthcare system has begun to shift. People are increasingly leveraging technology as it is cheap and effective. A study says that one in five internet users have used forums, blogs and communities to find patients with similar symptoms [3].

Challenges in Healthcare Business and UX
If our technologies are so advanced that we can make Minority Report – the movie a reality, why are there very few companies in this sector? Why are companies not successful in sustaining their existence? Why do they fail to create a persuasive user experience in the field of healthcare service? Google health is one such instance where the service was discontinued in 2011 with a statement on their official blog that the application did not make as deep an impact as the company presumed [4]. Some challenges are discussed in this section.
Reluctance to Adopt Technology: It is evident that the new generation of medical practitioners are embracing digital medical data, but there is enough controversial debate on adoption of technology. The medical practitioners are not yet comfortable with their next-gen gadgets. So, the struggle of health information technology to gain traction is still on.

Innovation is an abused Term: The word ‘innovation’ is a fusion of nova and ovation. Nova stands for a new thing and ovation stands for enthusiastic and prolonged applause. If something is new and is widely accepted and appreciated by then it is rightfully called innovation; else a new technology is an invention. So, companies that make technological advances do not necessarily ensure a successful product. It is a misconception that mere technological advances will drive business.

Less is more: Creating a simple user experience is unobvious and complex. A simple experience is focused and essential. Unfortunately, healthcare companies are often unable to comprehend the beauty of minimalism. Most companies are prone toward adding too many features to their product and making it more complicated. The process of simplification is expensive and time consuming. Thus, it forces the companies to make their products pricey. They are often unable to optimize the process of simplification. Few classic examples are: Magic Cube from Celluon - a virtual keyboard and Nike + FuelBand – a wristband to track user's activity and transfer data through USB or Bluetooth [5, 6].

Innovation and User Experience in Indian Healthcare System

One of largest and fastest growing sector in India is healthcare. According to PWC, the total value of the sector is equivalent to roughly 6% of GDP. By 2012, India's healthcare sector will touch the bar of $40 billion [7]. In spite of a high rate of growth, the physical infrastructure to accommodate the Indian booming population is still inadequate. So the middle class and rural Indian mass suffers from poor or zero access to healthcare services. A mere 25% of Indian population is accessing allopathic treatments while the rest is dependent on alternative medicine. PWC addressed Indian healthcare system as ‘a glass half full’ in terms of business opportunities [7]. A business strategy with disruptive innovation is needed to create a bottom of the pyramid experience and reach the unattended 75% of the Indian population. It is not an easy task for businesses to reach this 75%. The task is laden with challenges like illiteracy, lack of awareness, etc.

Spoken Web from IBM is one of the popular innovations that creates unique and inclusive user experience to reach out to rural India. Though it’s a pilot program, the power of experience inclusivity makes this technology a huge success in the agricultural sector in Gujarat. This experience cannot be extended to the 75% as statistics mentions the ratio of tele density in India to be 218.9 million rural versus 188.4 urban mobile subscriptions [8].

Building Tomorrow’s Healthcare Experience

While there are challenges strewn across user experience and technology adoption of healthcare, there are some golden rules that can be followed to build a robust, agile and inexpensive healthcare sector with the help of technology and business strategies.

Make Convergence for Divergence: Joel Grossman coined the term Bridge experience to define a seamless engagement across devices; irrespective of the format of information and condition in the digital realm and the physical world [9]. Imagine a situation where patients do not need...
to enter their health data to their iPhone and upload to Cloud. Instead, all data gets automatically updated to the doctor’s system. A smart layer will enable doctors to track the user’s data and advice preventive measure at an early stage. Elderly people suffering from Alzheimer’s disease will easily get reminders for their medicines as they look into their mirrors every morning. Ubiquitous computing and cloud computing can make this smart system possible in the near future. Convergence of experience in diverse realms makes a healthcare solution simpler, better engaging and more desirable.

**Plug and Play:** To address a larger set of needs within a competitive timeframe, it is important to think of a framework for modularity over an individualistic design approach. The flexibility of the framework increases the lifecycle of a product. For example, creating a perspicuous medical dashboard experience with lots of data and graphs is always a hectic and cumbersome task. Rather than creating separate dashboards for specific users, it is recommended to design modular elements inside portlets so that the elements can be plugged and customized based on user needs [Fig. 1].

A classic example of modular design is Netvibes dashboards [10]. In this framework, the same data can be represented differently based on user preferences. Netvibes dashboard framework is a good instance of robustness and flexibility.

**Add a Human Touch:** Designing next-gen healthcare experience sounds uninteresting. But to make an engaging experience is challenging and an interesting task. Aesthetically pleasant and emotion provoking products are more effective and desirable as people get easily attached to the products and overlook smaller usability defects.
Be wired for Empathy: Most applications are designed as knee-jerk projects without basic groundwork of gathering user needs. While creating an experience, a designer needs to step into the user’s shoes and comprehend real feelings and issues. The contextual inquiry method can help to gather data and get a holistic picture of common pattern of problems [11]. Unfortunately user-centric thought process is often neglected and patients are bombarded with data that is insignificant to them. This in turn makes such applications look abstruse to the patients. For example, such applications often do not care of the exclusivity of raw data. This results in a failure to convert the data into patient information for practitioners, thus making improper or zero usage of raw data.

Ability to Zoom in and Zoom out at the Same Time: Making complex things simple is an iterative process. During iterations, changing small things have larger implications on the overall experience. It is important to be able to zoom in and out at macro and micro level to get the depth and breadth of an issue at the same time.

Be Multi-disciplined: Good health information experience is a fusion of multi-disciplinary thoughts. Designers are often engrossed with the analysis of biological data and almost neglect behavioural data resulting in an unperceptive decision while solving a medical problem. Dishman from Intel Corp. has shown the importance of psychological and behavioural data over biological data. With his famous Magic Carpet experiment for elderly people, he recorded the kinetic data that is used to demonstrate the subtle changes in load distribution while walking. This data can be further analysed to predict if an individual might or might not fall [1]. Dishman’s famous phone experiment tries to understand the health condition of elderly patients with Parkinson’s, gauging the tremor and voice modulation tracked by the sensor attached to the phone [1]. Boersma’s T-model of user experience shows that back to back vertical silos are sharing horizontal overlaps of user experience that should be included as a key driver in business strategy at an initial stage of the process [12]. So the inter-

Figure 2: Boersma’s T-model
Source: www.beep.peterboersma.com
disciplinary problem solving approach makes the healthcare information more meaningful and successful.

**Proposed Overdrive Model**

The traditional way to create a successful healthcare solution is just a juxtaposition of technology and business strategies that typically fails to create people ovation and a slow rate of adoption [Fig. 3]. To take it to the next level, we have to relook at the entire process.

The proposed Overdrive model depicts how business strategy wheel and user experience strategy wheel comprising of behavioral technology strategy, behavioral, psychological and biological data collectively overdrive a successful solution process. In traditional delivery process, technology drives business to create a successful product. It is a forthright approach that neglects other important parameters.

In the proposed Overdrive model the business wheel and the experience design wheel are independent of each other. When business motor starts to drive the wheel, it drives the technology strategy, behavioural, psychological and biological data wheel that result in a movement on product creation wheel. But the pace of rotation is too slow to make a solution successful.

When experience design motor adds motion to the wheel right from the initial stage of the solution creation, it starts to build up extra thrust to make the solution successful in the market. [Fig. 4]

The main impediment to success of a healthcare product in the traditional model is the slow adoption of new technology adoption. But how can adoption be made faster and smoother? Adoption rate is directly proportional to efficiency of a product (E). And efficiency is indirectly proportional to system response time (T_r), user task completion time (T_u) and total errors (e).

$$\text{Adoption} \propto E \propto \frac{1}{(T_r T_u e)}$$

Where total errors (e) = system errors (e_s) + user errors (e_u)

And T_u and e_u are called usability factors that form a major part of experience design strategy.

Today technology is so advanced that less response time and zero e_s can be easily achieved with the help of powerful and optimized architecture strategy. In the traditional model, business strategy is armed with only less T_r and well optimized codes. Companies are trying to make a successful product with the help of these. But this model has been rendered incompetent by other important factors that are ignored [13].

In the proposed overdrive model, usability factors play an important role because sometimes T_u and e_u contribute to the life and death of medical products. More T_u and e_u can lead to poor readability, memory overload, errors and overly complicated workflows. A field study shows that medical products failed miserably due to improper implementation of experience design strategy [14]. Yet another study shows that critical

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**Figure 3:** Tradition Model  
**Source:** Infosys Research
To create a startling experience, it is important to have user experience experts on board at a very early stage of ideating and creating a solution. It is equally important to sensitize people about design philosophy and alternate thinking processes. A collaborative multi-disciplinary approach with empathy has the potential to create an impactful healthcare experience around a convoluted design challenge. We will be able to transform the constrictive passage into doors of opportunity by optimizing our technology through innovation with socio-physiological endowment.

**Conclusion**

Medical devices like central monitoring station, electrocardiogram (ECG) analyser, ventilator system, etc., used in intensive care unit (ICU) have an alarming number of issues related to usability and human factors [14]. Similarly, a study discussed 22 ways in which a computer system makes the physicians prescribe wrong medicine to the patients. Most of these issues are solely related to usability factors [15].
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With the evolution of modern web technologies, Web 2.0 applications like mash-ups, social networking platforms and social games showed significant growth. These modern web applications demand rich interactivity at the user’s end and thus, most of the computing logic began to shift from the server to the client. Though there are proprietary plug-ins like Flash, Silverlight, etc., that provide rich user experience and capabilities in the browser, majority of platform providers are shifting toward using open web technologies and protocols so that they can reach wider audience and devices.

HTML5, the fifth major revision to the core language of the web, introduced several new standards that complement the deficiencies of HTML4. The features added in HTML5 help in solving several inherent problems of the web and bring rich interactivity to the users, providing an open and standardized alternative to proprietary plug-ins. The key programming language used to execute all the qualities of HTML5
is JavaScript that is interpreted right in the browser. With major platform providers, browser vendors supporting HTML5 and iOS devices abandoning flash, the developer community shifted focus toward HTML5. While it brings new capabilities to the web, HTML5 also increases the attack surface. This paper highlights security considerations of some HTML5 features to be taken care while building future web applications.

User Experience and HTML5

HTML5 has several new features that directly enhance user experience. For example, new tags like <video> and <audio> helps to play video and audio files directly in the browser without any external plug-ins. This results in an enhanced user experience of natively watching audio and video content without worrying about any additional plug-ins to be installed and their compatibility issues. Some of the new, intuitive user controls in web forms such as email, date, time, etc., help in providing quick feedback to the users if there are any validation errors. The new <canvas> tag allows drawing rich animations in the browser entirely on client using JavaScript. Such enhanced user experience clubbed with the benefits of CSS3 and SVG provide an excellent browsing experience to the user.

HTML5 introduced several other capabilities that helped to enhance user experience. It led to high responsiveness and perpetual availability of web applications. HTML5 also introduced several new ways of communication between widgets from different domains that are hosted on the same web page. This feature allows developers to build innovative collaboration features that were not feasible otherwise. Some of these indirect enhancements to user experience include:

- Ability to store and access huge data on client machine that is accessible from JavaScript without requiring it to be transmitted back and forth between client and server. This resulted in more responsive applications consuming low bandwidth (web storage).
- Facility to cache web resources like html, css, javascript, images, etc., on client machine that is accessible locally even when the network is not available. This resulted in offline web applications (application cache).
- Storing structured data in lightweight databases on the client side that can be queried using familiar SQL constructs.
- Sharing user’s geographical location to build context (location) aware applications.
- Ability to communicate between applications from different origins that help in building new ways of collaboration (post messages/CORs).
- Providing faster real time communication channels (web sockets) that enable clients to receive instant data from servers without requiring clients to poll data from server repeatedly. As an example, a dashboard may get updates from servers and update the display without the entire page getting reloaded.
- Drag and drop capabilities in the browser that help in creating intuitive user interfaces.

New Elements and Attributes

HTML5 introduced several new elements, attributes,- and event handlers to support new functionality natively. For example, video can be played directly within the browser without any external plug-ins using a simple tag like,
“onloadstart” is a new event handler introduced to write custom actions. Email tag allows mobile browsers to display the keyboard that is suitable to type email addresses. Similarly, automated validation for proper email text entry happens with this specific tag where the users are not required to write additional JavaScript validation routines.

There are several such new elements, attributes and event handlers introduced in HTML5. While these new elements provide new features, they also increase the surface area of attack. For example, Cross Site Scripting (XSS) is one of the prominent vulnerabilities in web applications. Typically, XSS occurs in web applications on pages where the text entered by a user is written back to the browser without validation. Common examples are discussion lists, blogs, user registration forms, etc. If users enter malicious JavaScript, the unsuspecting server may write the same script back to browser that gets executed, resulting in damages like stealing of session cookies. XSS is generally prevented by one or a combination of the following methods:

- Output encoding
- White-listing specific user inputs
- Blacklisting specific user inputs.

A blacklisting-based approach involves rejecting all user inputs that is registered as bad. For instance, this approach rejects user inputs that contain known malicious JavaScript functions, html tags and attributes. If the blacklist-based approach is used to protect HTML5 based web applications directly, it will fail as the blacklist will not be aware of any of the new insecure HTML5 tags, attributes and will allow these to execute. Developers using blacklist filters should either update their filters to accommodate the new tags in HTML5 or should implement other secure methods like output encoding or white-listing.

**Web Storage**

One of the major advantages of desktop application is the availability of huge client side storage to save application data locally without any network dependency. Such client side storage significantly increases the user experience in terms of UI responsiveness as there is no network latency. This facility is not available in web applications as the client side storage is inaccessible to mobile web code due to security reasons. Prior to HTML5, the only mechanism to store small chunks of data on the client side was cookies or the use of vendor specific application programming interfaces (APIs). Cookies have their own limitations like limited storage and are also included in every HTTP request that result in the consumption of more bandwidth. HTML5 introduced the concept of web storage that allows web applications to store large data on the client machine that can be managed through the standardized JavaScript API. Web storage allows applications to store data on local machines and access the data locally using JavaScript, resulting in a more responsive UI. Unlike cookies, data stored in web storage is not transmitted to server with every HTTP request. This results in less consumption of bandwidth. Web storage forms a critical feature to build desktop-like web applications that are more responsive and available offline in the absence of network. Applications typically store the required data in local storage when the network is not available, allowing users to use the application and synchronize the data with the backend server once the network is available.
Though web storage is defined with security in mind, it can result in an increased attack surface when developers make false assumptions about it. For example, the data saved in web storage is typically stored in clear text in client file system and is easily accessible for reading and editing that often result in confidentiality and integrity breaches. Applications that are designed to use web storage need sufficient confidentiality checks and validations before trusting such data on server. Any single XSS vulnerability in the web application allows attackers to completely modify or export the data in web storage to the attacker's domain. While web storage is implemented based on the same origin policy that restricts the web storage to be accessible only to the scripts from the same origin, this can be bypassed through DNS spoofing attacks if such vulnerabilities exist. Also, some of the protection features available for cookies like Secure and HttpOnly are not available for web storage. Consider a scenario where an enterprise application is developed to support mobile workforce using the web storage capabilities. While the field men continue to use the application and store data offline in web storage as they work in the field, it is critical that the server does the validation before accepting and synchronizing the data with the server data once the client is connected to the server. Also, as the client side storage data is completely in control of the client who can delete it accidentally or intentionally, appropriate controls need to be built into the application about the availability of such data.

Cross Document Messaging
In majority of the modern web applications, data from multiple domains mashup and exist in the same browser window, for example, iGoogle, Facebook. These applications often need to interact with each other to enhance user experience like showing personalized information based on user’s preference, syncing data across different widgets based on user’s actions within one widget, etc. As an example, consider a mashup like PageFlakes. We see different widgets on the page that are from different origins.

Let us assume that there is a calendar widget and a weather widget that are showing today’s information. It would be more useful if a user can select a date from the calendar widget and see the relevant information in the weather widget. This requires communication between the calendar and weather widgets hosted on different domains, which is not feasible with the standard same origin policy implemented by browsers; only scripts from the same origin can communicate with each other. Prior to HTML5, developers needed to use hacks to achieve this.

However, HTML5 provides a new API called PostMessage to fix this problem. Using this API an application (window) can post a message to another application (window) using JavaScript code like: window.postMessage(message, targetOrigin);

E.g., calnderWidget.postMessage(“Today Date”, http://weatherwidget.com);

This feature makes cross domain client side communication feasible without the need for hacks. Adequate care has to be taken while implementing these cross domain messaging capabilities, or else correct configuration may lead to more vulnerable web applications.

Confidentiality Threat: If the target origin is configured with a wildcard parameter “*”, it opens doors to any party to listen to the communication between two windows and/or steal the data. It is always a good practice not to use wild cards (“*”) when the intended target is configured.

Client side Denial of Service (DoS) Attacks: Windows receiving message from other
domains must check for the origin of the sender. If this is missed, an attacker can post message from multiple windows resulting in client side Denial of Service (DoS) attack, which freezes or crashes the browser. Thus, it is suggested to check for the origin of the sender before accepting any input.

**Data Validation:** Receiving parties should validate the data before consuming it directly. This is important as vulnerability in the sender’s widget can post dangerous code to the receiver. It is a good practice to always check the data type received before using it. Also, it is suggested not to perform operations that will directly execute the data or inject it into the document object model (DOM).

**Cross Origin Resource Sharing (CORS)**

In traditional web applications, updating data on the browser requires a complete page reload with the response received from server, thus causing a kind of flickering affect. For example, a typical cricket scorecard needs the complete page reload to update the latest score in the browser. With the advent of Asynchronous JavaScript and XML (AJAX) communication, partial page updates without the need for complete page refresh was made possible and it increased responsiveness and user experience to a great extent. As an example a stock quote or cricket score can be updated instantly without requiring the entire page to be reloaded. All modern web applications like Hotmail, Facebook, Twitter, etc., use AJAX to load data from their respective servers without the need to refresh the page for updated information.

But the drawback in using AJAX is that a request can be made by a client to the same server from which it is served (same origin policy) and cross origin AJAX request will fail.

![Figure 1: AJAX, PostMessage and CORS communication mechanisms](source: Infosys Research)

This severely constrains the feasibility of integrating applications from multiple domains. This is addressed by HTML5 CORS specification that allows communication between cross domain widgets. Figure 1 depicts AJAX, PostMessage and CORS communication mechanisms.

Using CORS, JavaScript from Site A can now make a request (XMLHttpRequest) to resources on Site B, which was not allowed earlier as per the same origin policy. However, Site B has to approve this communication to prevent the breach of security by anonymous requests. This is achieved by including a special response header in its response: Access-Control-Allow-Origin: Site A.

However, allowing cross origin resource sharing introduces several new combinations of attack scenarios. For instance, consider an intranet application scenario in which different applications are hosted on different servers. Interaction between these different applications is a natural requirement and to allow this the developers use wild card (*) in Access-Control-Allow-Origin header instead of

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listing specifically only the servers that need such access. Such a decision can cause major security damage if an attacker lures an employee to visit a malicious website from corporate network and the malicious site makes a cross origin request to an important internal application. The wild card allows all requests to be allowed and in this manner, the attacker site gains access to the internal application resources. Thus, it is very important not to use wild card and always specify the domains that are allowed access. Similarly CORS can be used in combination of an XSS flaw in a website to hijack user's browsing session and run arbitrary HTTP requests with the privilege of user. This is called a reverse web shell. Thus, it is important to avoid any XSS flaws in sites that use CORS.

**Drag and Drop Capabilities**

Drag and drop is the most familiar and friendly user experience in desktop application but it has not been the same with web applications. HTML5 introduced native support for this feature in web applications that further reduces the gap between desktop and web applications. Elements can be dragged from one part of a web page (drag zone) and dropped into another part (drop zone). This will increase user experience in several scenarios like drag/drop based shopping carts, online games, moving emails from one folder to another, etc. However, if dragging and dropping of content is allowed between applications from different domains (cross origin) then the action introduces new types of attacks. Similarly drag/drop API increases the severity of known existing attacks like Clickjacking.

It is very difficult to stay safe from social engineering attacks that make use of drag/drop API. On web applications, users need to stay away from games that ask for any suspicious information that can be easily stolen.

**Offline Web Applications**

One of the major drawbacks of web applications is their dependency on the network. Web applications are considered as online applications that are available only as long as the network is available. However, with the increasing pressure to support mobile workforce that may not have a network available always, it is critical that the applications are available offline. This significantly contributes to a positive user experience where the user is allowed to continue working offline even if the network is not available. Prior to HTML5, vendors had implemented this feature using their proprietary technologies. As an example, Gmail used to have a ‘work offline’ feature using a technology called Gears. However, HTML5 introduces a similar feature called Application Cache natively that helps in caching files in the browser and making an application work offline. The list of files like HTML, JavaScript, images, CSS, etc., required to work offline will be specified in a special file called ‘Cache Manifest’ so that the browsers save them locally in their application cache on user’s machine during the first log in session. Subsequently when the application is accessed later in the absence of network, the browser loads the content from this local cache and allows the user to continue using the application. Any data that is generated by application can be stored in local storage that can be synchronized with server later.

However, caching content for offline usage is susceptible to cache poisoning attacks. For example, let us assume that a user surfs a website that uses application cache in an insecure wireless network. If an attacker can sniff the user’s traffic, the attacker can return a fake page and trick the user. This fake page will be cached by the user’s browser due to application cache configuration. Now if the user goes back and surfs the
Conclusion

HTML5 has introduced several new direct and indirect features that help enhancing the user experience in web applications and bridge the gap between desktop and web applications. However, increased set of features also increase the attack surface and expose the web applications to new combinations of attack vectors. While in some cases HTML5 introduces new attack vectors, in some other cases it makes the existing attacks easier to exploit. Also, as the standards are evolving, it is highly probable that new vulnerabilities may be discovered and implementation bugs by browsers will be uncovered by security researchers and attackers. While the new set of features in HTML5 inspires the developers across the world to build exciting new applications that were not natively possible earlier, we strongly suggest the developers to do so while leveraging lessons on web security learnt in the past. Developers need to understand clearly the security implications of using the new HTML5 features and build appropriate security controls into the system to mitigate the risk of exposing their web applications to new vulnerabilities.
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UX: The Real Differentiator in Consumer Banking

By Narayanan Venkataraman and Anil Radhakrishnan

Innovations in user experience can help consumer banks to attract and retain customers in a hyper-competitive environment.

Till recently, customers of consumer banks used to visit the bank premises often. They had to visit the branch to open an account, to get a loan and for other regular cash transactions. The staff in the branches knew their customers to the extent that they knew their earnings and expenses, temperament and family conditions too. Such personal information helped the bankers to keep a customer satisfied, if not delighted. Providing the right experience for the customer has always been a priority for banks, but it was often expressed through the right treatment offered at the branches by particular individuals who knew the customer. With transactions getting done more and more through automated channels, the customer today does not have to visit the branch often. In many cases, they do not have to visit the branches at all. But then the need to provide a differentiated experience to the customer remains the same. In fact, the need has grown manifold.
In a highly connected world, products and services introduced by one bank quickly gets replicated the world over. The ever-increasing constraints placed by the regime of regulations do not leave much scope for differentiating a lot in terms of rates and charges either. The consumer banking world has truly got commoditized. The only real differentiator between banks then gets to be how they understand and treat their customers, not just when they visit their branches, but wherever and whenever and through whichever channel the customer gets in touch with the bank: branches, ATMs, internet, mobiles and so on. The real challenge for the banks is to provide the emotional connect in a digitized world. How well they leverage high-tech to offer the high-touch experience to the customer will be a big factor in deciding how successful the banks will be.

**User Experience in Banking**
User experience is usually perceived as technologies like RIA, augmented reality, gestural interfaces and so on that help improve the usability of the bank’s applications that are meant for the direct use of the customer. But, that is only a small part of providing the right user experience. In reality, the emotional connect with the customers can happen only if the bankers know them well and are able to offer the exact solutions that suits their current context in a manner that delights them and makes it easier for them to understand and act. ISO 9241-11 on the Concepts of Usability mentions user satisfaction as an important goal to achieve, on par with effectiveness and efficiency.

Providing an experience that delights the user involves the following three steps:
1. Understanding the customer
2. Knowing the context
3. Delivering the experience [Fig. 1]

![Figure 1: The three steps in providing a superior user experience](source: Infosys Research)
Understanding the Customer
In the personal contact era, understanding the customer would have depended on the discernment skills of the branch staff. In the era where the essential interactions happen through the technology channels, it is natural that the understanding should also arise through the use of technology.

Traditionally, banks had done segmentation of customers based on obvious parameters like geography, age, net worth, etc. They used to create products for such broad segments and sell the products to the target segments. In today's world, besides the data that banks have about the economic, social and cultural background of the customer, analytics play an important role in developing a deep understanding of the behavior of the customer. With the intelligence that such analyses provide, segmentation gets to be a lot more flexible. For example, Frost National Bank offers life events-based planning with plans for graduation, starting a career, wedding, buying a home, starting a family, career changes and so on.

In fact, banks can do away with segmentation and offer personalized products that are made-to-order to suit the needs of an individual customer. For example, customers who want to open a checking account with BBVA Compass Bank can select the essential features of their account and the bank would put together a fully customized account for them. Providing the right experience while servicing such customized products also requires that the banking personnel study and comprehend the background and behavior of the customer. Some large banks use complex business rules to offer proactive help through chat to those customers who may need it during online transactions.

Knowing the Context
If you are traveling to a new place, you would not only be interested to know the general climatic conditions of the place, but would also want to know how the weather has been there over the past few days. It is likewise important not just to understand the customer in a generic way, but have a more specific understanding of the exact current context of the customer to be able to offer the right experience. For instance, if the bank knows that the customer has been exploring the internet trying to compare prices of different makes and models of cars, it will help the bank to be ready with the rightly-packaged auto loan whenever the customer gets in touch through any of the channels.

Till recently, the banks have mostly been working with third parties that can help them get this intelligence about the customer's context. For example, Bank of America has tied up with Zag Car Buying Center to offer its customers an online research and purchase tool. Some other banks offer expert reviews and pricing information of the vehicles that auto loan prospects are looking for.

Lately, much of this intelligence gathering has started happening through big data networks, ‘social listening’ and analytics of unstructured data. Banks might know if a customer has been comparing auto prices anywhere on internet and not necessarily through the bank's portal. With increasingly complex integration that help data move seamlessly from system to system, there will be an enormous explosion of such ‘smart data’ that will be available for the banks to exploit.

At a micro level, some applications are intelligent enough to discern the mood of the customers and provide a suitable experience accordingly. For example, American Express tries to spur on online applicants who show signs of abandoning (e.g., who start to move their mouse to the top part of the screen) by reminding them of the benefits of the product. If they
still want to move on, they can provide an address to send reminder e-mails as follow-up.

**Delivering the Experience**

Of course, there is no use having a deep understanding of the customer and the context if we are not able to express it back to the customer through personalized messaging and offerings. For a bank, it is more important to provide a consistent experience to a customer over a period of time across multiple channels that the customer may choose to interact than to provide an occasional ‘A-ha!’ moment. Not surprisingly, almost all major banks are currently involved in doing work related to integrating their multiple channels that have grown independent of each other due to historical reasons. Many banks are also trying to enable seamless switchover of channels during a transaction. That is, if the customer initiated and partially completed an operation (say, account opening) in one of the channels, she must be able to continue and complete it in any other channel. It is probably not a right approach anymore to expect the costs of any channel to match the returns from that particular channel. The channels should be viewed as an inter-connected whole.

It is also important for the banks to use the right channel for the right need. For example, branches should be used to provide a personal touch to the customers while ATMs should help in quickly completing transactions. Banks must
also consider the channel preferences of people in different geographies they are operating in. For instance, while online banking leads the scene in many countries, it has not quite picked up in a few other countries, like Italy.

Let us see how some banks provide differentiated experience to their customers on each of these channels.

UX in Branches
Traditionally, the branches of most banks were focused on transactions. One entered the bank and saw signs on counters and long queues. With transaction volumes shifting to automated channels, the expectations of the customer visiting a branch is significantly different. The branches are now seen as interaction centers where the experts from the bank are available to offer advice and solutions. No wonder then that many consumer banks are re-configuring their branches to provide an experience to suit these expectations.

Branch layouts of many banks now offer lounge areas, meeting spaces and video conferencing facilities. Conspicuous signage leads the customers to these areas. Teller lines and cash counters are de-emphasized. Some banks maintain a presence in other premises like supermarkets and coffee shops to catch the customers where they go. An Italian bank Che Banca! provides banking services through pop-up branches in large retailers’ stores. North Shore Bank has mini branches that offer a drive-in experience adjoining gas stations.

Banks are also using augmented reality to jazz up a few high-end branches. Some use avatars on touch-screens to offer advice to the customers and help them in transactions. Santander bank has launched a branch with huge tactile interface walls, flowing LED lights and technologies that transform the surroundings into an interactive digital space.

UX in ATMs
ATMs continue to be an important channel of transactions for the consumer banks. Often, there is a queue of people waiting and it is important that customers are able to complete their transactions quickly and move out. Being an oft-used channel, this is a good channel to catch the customer’s eye with messages regarding the bank’s products. It works best when the messages are tailored for the customer and is offered in a non-intrusive manner without affecting the essential transaction that the customer came to the ATM for.

There have been quite some innovations to enhance the user experience on this channel too. Some banks offer additional functionality in ATMs such as facility to buy tickets for airlines and movie shows. Raiffeisen Landebank in Austria even allows customers to play games on some high-functionality ATMs. Wells Fargo offers an e-receipt option that sends out the ATM receipt to customer’s e-mail address rather than printing it.

UX in Online Banking
Online banking is getting to be the most important channel for banks and that is where the banks are striving to provide the best user experience. Internet is particularly the channel of choice for prospective self-directed customers to research about products. Banks are spending huge amounts in an effort to provide better online experience, but these projects pay for themselves within a short period of time. Sovereign Bank revamped the online channel and within three months the bank sourced more than $2 million in new deposit leads.

Good online sites offer interactive tools, calculators, comparison charts with other products the customer is familiar with. Such sites send e-mail
alerts for incomplete transactions, allow personalization by the customer like customizable menu of quick links and also allow customers to save incomplete work and continue later. Even on the online channel, customers do get stuck sometimes and may need to reach out for help. Many consumer banking sites provide online chat facilities to connect to a bank executive who can help. Some banks proactively offer a chat facility, based on the customer and the context. Spanish bank, Bankinter, even offers an online video conferencing service. This system is integrated with its CRM system to ensure the executives being conferenced have the complete background of the customer.

UX in Mobile Banking

With the exponential growth in popularity of smartphones, the mobile channels offer exciting possibilities for banks in providing location-aware services to the clients besides offering an inexpensive and quick way of catering to most of their transactional needs. Quick bites of personalized messages on mobiles are a good way to get the customer’s attention, but the bankers need to be sure to do it only if the customer has opted in.

Many banks have offered branch and ATM locator applications for smartphones. ING has introduced an application in Netherlands that sees the direction the phone’s camera is pointing to and enhances the view screen with the bank’s ATMs in the vicinity. Some banks offer location-based coupons. Going further, Commonwealth Bank of Australia has tied up with a third-party to launch an augmented reality application that helps its prospective home loan customers in property search.

UX in Social Media

Banks are beginning to realize that social media is not just a one-way channel to broadcast their messages, but it is a valuable way to understand what the world thinks about them. Progressive banks have deployed complex tools to monitor and measure the sentiments being expressed about their products and services on the social media.

Adverse messages on the social media can quickly snowball and create strong negative sentiments about a product or a service. It is not only important for the banks to catch such a trend early, but also act on it immediately to correct the situation as much as possible. For example, ING Direct Canada launched its checking product with 20 checks in the first check booklet. Listening to the large number of adverse comments about this,
the bank quickly changed it to offer 50 checks in the first booklet.

The banks can also monitor the social media presence of their business clients to offer a better experience to them in their transactions. This can be particularly helpful during negotiations for commercial credit.

Conclusion

The past decades have made fundamental changes in the way people approach money. Plastic cards have replaced cash to a great extent and may soon themselves be replaced by virtual money in mobile wallets. Checks are on their way out. Brick-and-mortar branches are getting to be redundant in a click-and-be-done world. Soon, people will not go to the banks anymore, but will carry their banks wherever they go! But one thing that has not changed is the customer’s yearning for a superior and unique experience. It has always been and will continue to be a key factor in retaining, and attracting new customers in consumer banking. The banks that provide this differentiation in user experience are the ones that will survive the downturns and thrive during the better times.
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Can you imagine a business enterprise without a business intelligence (BI) system? BI has grown to be the central nervous system of a modern business enterprise. Timely collection, collation, processing and distribution of key business insights to decision makers are imperatives for running a competitive business. While collecting and processing the information was a challenge in early days of BI systems, the set of challenges dogging the new age systems have more to do with information overload for the recipients of information. The size and complexity of information that needs to be communicated to a business manager has increased manifolds over the years. As result, business managers get buried under myriad reports to the point that they begin to avoid using BI systems and develop their own workarounds. BI dashboard was originally conceived as a tool to tame this information overload and communicate the business insights in an efficient and visual manner. Most of the commercial-off-the-shelf (COTS) BI suites...
now come with a dashboard module. These modules generally allow any BI analyst to link analytical results to commonly used visualization widgets like charts and gauges to render engaging displays of BI results.

The relative simplicity and ease of deployment of modern BI dashboards suites has led to the proliferation of dashboards across enterprises. BI dashboards were originally conceived as a focused communication tool. But they have gradually become an over-used and ineffective tool as communication design aspects went ignored. Professional communication designers and user experience (UX) designers trained in information design and visualization have the right skills to address these issues. Enterprise IT departments understand the need for good UX as an effective strategy to drive up the adoption rates and the return on investment (ROI) in BI; but they have a hard time finding the right level of skillset or bandwidth from UX design resources. A large percentage of BI implementations across the industry can improve the rate of adoption if impediments like UX aspects are addressed.

This paper presents a way to partially overcome UX design skill limitations by helping a BI analyst to tap into UX design best practices that align with their dashboard design process. The proposed approach combines strengths of three different design methodologies – user-centric design, patterns-based design and iterative design. Collectively, these three approaches can help to keep the dashboard design firmly aligned to the underlying business objectives of end users, provide access to BI UX best practices to get the basics right and ensure that analysts arrive at an optimal solution iteratively. The paper captures some of the accomplishments of the experiments in this area and identifies limitations of relying on guidelines and best practices as a way to make up for skills shortage.

Origin of Business Intelligence Dashboards

The term dashboard was originally used for BI systems in automotive interior design. The term fits well into the business scenario as the BI dashboards combine necessary displays and controls to put business managers in a position of control and help them make right decisions at the right time.

Figure 1 shows a typical BI dashboard implementation. Any well-designed BI dashboard is supposed to give a quick synopsis of present day reality of the business just like an automobile dashboard. The dashboard designer has to carefully pick a few key performance indicators (KPIs) that fully capture the pulse of business and display information with appropriate mix of numerical or visual representations. Based on the intended audience and purpose, dashboards can be tailored to display strategic, operational, analytical or just plain informational KPIs. It is also common to integrate some alerts and comments with the KPI displays to make dashboards more informative. The use of dashboards over the last decade has been widespread and has become essential in large enterprise organizations as they have inter-dependencies with modern management approaches like the balance scorecards that have been promoted by Kaplan and Norton [1].

Common Concerns with BI Dashboards

While the technology used or reporting tools have an impact on the appeal of a dashboard, it is observed that there is a very consistent pattern of user complaints that is technology agnostic. In most cases, business users complain that it takes too long to find the information they are looking for or they need to navigate through multiple levels before they arrive at the information they seek. Also, dashboards often do not provide the complete information and clients need to refer to multiple other systems to get the
complete picture. At times dashboards seem to display incrementally more information, often blurring the line between dashboards and reports. As a result, business users are not able to drive their businesses intelligently based on the information they see on their dashboards.

On the other hand, dashboard developers are faced with limited time and budget to deliver the dashboards. The focus is on making the information available on the screen with very little focus on how people use this information or what the information signifies. Most dashboard developers have very little knowledge of user experience. They typically tend to be database or data warehouse experts. These issues lead to a spiral where enterprise BI dashboards lose their significance in the decision making cycle and the entire BI investment gets questioned.

**Design Methodologies**

**Addressing Design Skill Concerns**

User experience design is a well-organized design profession that draws methodologies and design practices from various fields like industrial design, human computer interface design, interaction design and visual design. Each field has contributed a variety of design practices and UX practitioners continue to innovate and develop new methodologies to address emerging design challenges. These methodologies and UX best practices can even help an amateur in the field to improve the quality of her dashboard UX design.

As a team of experts set toward developing an appropriate UX methodology
for BI dashboard, the challenge seemed twofold – putting together the right mix of simple, easy to use UX methodologies that an average BI analyst can use and learn quickly, and putting together a playbook that the BI analyst can use as a practical best practices reference. To accomplish these two objectives, the team opted for a mix of three different design methodologies that collectively provide a set of simple and easy to implement design practices. It is important to understand that even the best combination of methodologies and playbook definitions cannot replace the value that a trained UX professional adds to the project as design is at the core of a creative process. The approach that the team developed is a way forward to transcend the dearth of creative skills in the corporate IT world.

The first methodology added to this mix is called the user-centric design. It ensures that the end user is at the center of all design activities and seeks to understand the user needs and motivations to feed the ultimate design solution. The second methodology is iterative design, a design philosophy that recognizes that great design is not achieved through a master stroke of a genius designer but through careful, iterative improvisation that addresses user needs. The third design methodology is called patterns-based design. This approach is based on leveraging previously documented, modular building blocks of design sub-solutions to assemble and develop the final design solution [Fig. 2]. The Playbook content, in particular, was organized and populated using patterns as the central theme as most IT and BI analysts are already exposed to IT architectural patterns and can see how UX patterns can be used to develop alternative UX design solutions.

**UX Design Patterns**

Patterns are modular building blocks that can be selected from a pattern bank and combined together to develop alternate design solutions, just the way LEGO pieces can be combined together to make various LEGO models. Use of patterns as a tool to reuse best practices and to simplify or guide the design activity originates from the domain of architecture and building construction, and has been rapidly adopted since its origin in mid-nineteen seventies [2]. Researchers in the field of software engineering saw obvious similarities in this approach and thus used terms like *software architecture* and *enterprise IT architecture patterns* to describe the reusable components in their work.

User experience design as a field began experimenting with the notion of user interface patterns from mid-nineties when a lot of academic research in US and European research labs saw the potential in this approach. Since then, several well-researched and peer-reviewed papers and theses have been published on this topic; and some large online resources like Yahoo UI patterns library are now available for designers to refer to and simplify their design process.

The team working on the new methodology studied Tidwell’s canonical work and interpreted it in the BI context to develop an alternative set of BI UX patterns [3].
The team also understood the context of the sponsor company and the intricacies of their preferred BI platform to develop a comprehensive BI UX Playbook that includes generic best practices as well as some specific advice that relates to the BI platform they use.

**Using UX Design Patterns for Modularizing Dashboard Design**

The task of designing a BI dashboard for various corporate end user groups includes three inter-related sub-activities [Fig. 4]. The first sub-activity tries to understand the needs, motivations and pain points of various user groups of an enterprise BI system and tries to identify patterns or similarities in these needs. There are some previously researched and documented patterns of BI user needs that indicate that there are common user needs from a BI dashboard across corporations and industries. As part of the project, the team leveraged previously understood BI user need patterns like one view of business, management by exception and compare, compare, compare. The team also tried to extract some additional user need patterns based on unique needs of end users at the sponsor enterprise.

The second sub-activity is focused on the common factors across user groups than on unique needs as seen in the first sub-activity. There are some behavioral patterns that are consistent across all user groups as human beings have some common traits in terms of perceiving, processing and reacting to information. Most of these behavioral patterns emanate from the field of Cognitive Sciences and describe what users do. The behavioral patterns documented by UX researchers were noted and interpreted to design the BI dashboard. These two sub-activities when combined together provided a

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**Radial Table**

**What**

Show a table or list of items as a circle instead of a column. Draw connections among items through the interior of the circle.

**Use when**

You have a long list or table of items and you need to show arbitrary relationships among them: flows, connections, affinities, similarities, and even numerical values (encoded by the thickness of the connection).

**Why**

A circular presentation enables free-form connection lines to be visualized far more easily than a line or column of elements would permit. Such connections have a shorter, straighter distance to travel when drawn between points on an arc than points on a line.
very strong set of user-centric design pattern to be used eventually for the design exercise.

The third sub-activity involves understanding and re-interpreting the existing body of knowledge around UX patterns in various categories like page organization, navigation, command and controls, and information visualization. The analysis and re-interpretation process showed that some of the UI patterns like global navigation and recording the actions that are considered useful in generic interactive design project are of not much use in dashboard design project. This is because a dashboard is largely a one-way communication tool and design strategies are significantly different as compared to an e-commerce site exposed to entire global customer base. Some patterns like alternative displays and extras-on-demand that deal with handling information overload are very relevant and can be extrapolated to make meaningful difference toward dashboard design quality.

The team documented each relevant UX pattern by gathering highly contextual information on what each UX pattern is about, where it can be used and how the pattern can be used. To make this information useful, the patterns’ descriptions were augmented with pictures showing proper and improper usage of pattern for BI dashboard design. Figure 5 shows...
How to Use this PlayBook?

**Step 1** End user interviews
For effective use of this BI User Experience Design Playbook, it is a pre-requisite that the project team should spend time with end users to understand their goals, motivations, pain points and ideal world scenarios. You can use the interview guidebooks included in the appendix to conduct the interview.

**Step 2** What users want
Based on the interview findings, try and map the profile of the proposed end user to one of the three typical Cisco BI User personas (included in the appendix). In case there is no fit, develop a new persona using template provided. The three personas included tend to have strong mapping with user motivation patterns documented in 'What Users Want' section. Pick the most relevant motivation patterns.

**Step 3** What users do
While persona definition helps in aligning dashboard design with unique needs of end user, there are certain design best practices that need to be implemented irrespective of the user type. Some of these are captured in the 'What Users Do' section. Review the patterns listed here and plan on implementing the ones that make most sense for design problem at hand.

**Step 4** Design patterns and best practices
Based on the persona mapping, motivations (What User's Want) and pain points pick recommended or relevant design patterns from categories like page layout, branding, navigation, actions and commands and data display. Use listed best practices for OBI and follow branding customization related steps.

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**Figure 6**: Playbook of BI UX Design Patterns can be used for De-skilling Dashboard design

*Source: Infosys Research*

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an example of a BI UX pattern as documented in the playbook.

The playbook is a patterns and practices bank constructed around various BI UX design patterns. The team developed a mapping between user personas and user needs patterns; and user need patterns and UX design patterns to allow the playbook users to pick the most relevant patterns. In this manner, the BI analyst gets some pointers vis-à-vis the most relevant user need patterns to be focused on as she knows the overall user persona of the target user group. The selected user need pattern(s) then drives the tactical UX design patterns that need to be assembled together like a jigsaw puzzle to put together a concept for dashboard design. Figure 6 shows how the playbook can be used to put together early design concepts.
Conclusion

Some key lessons were learnt while experimenting with the usage of BI UX design playbook. User-centric design and patterns-based design are useful in laying down a foundation to get most BI UX aspects right, but it is important to understand that some amount of innovative, out-of-the-box thinking and iterations are necessary to get optimized design solutions. Any BI analyst charged with the task of BI dashboard design should use the playbook to develop core design concepts in the form of low-fidelity paper prototypes or wireframes. The low-fi prototypes should then be reviewed with the end users and trained UX designers and their feedback should be integrated to enhance the overall dashboard experience design. It is important to remember that some of these iterations may involve going against or beyond the prescribed best practices in playbook. BI analysts should make a conscious decision in this regard as the design involves some amount of experimentation and it is possible to fix some of the issues by gathering feedback as the dashboard gets deployed in the production environment.

References


Authors’ Profile

Chandan Gokhale is a Principal Architect with the Design Innovation Group at Infosys Labs. He is a qualified interactive designer and software architect with consulting experience with some of the best firms in the industry. He has hands-on experience in designing and developing high impact mobile, web and desktop applications for consumer as well as enterprise IT markets. He can be reached at Chandan_Gokhale@infosys.com.

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Geographical boundaries have become insignificant. Thanks to globalization! The business world is reaping the benefits of open economies and new business opportunities are explored every day. It could have been truly as easy as it sounds, had it not been for the cultural differences across countries. A mere multilingual approach in business does not bridge the gap of cultural differences. Experts in Culture Studies do agree that a multilingual approach forms a part of solution, but it is certainly not a comprehensive approach. The business world understands the need to focus on User Experience (UX) across different mediums as an integral part of the decision making process of a customer. UX is all about how the user interacts with applications vis-à-vis symbols, colors, navigation, language and verbal and psychological factors.

It is imperative that we understand the cultural dimensions while integrating UX aspects when applications are developed. Leading Anthropologist Geert
Hofstede studied over a decade and created a large database of cultural statistics for different countries across various cultural dimensions [1]. This study is of immense help to understand cross cultural patterns among users. This paper is based on Hofstede theory and focuses on comparing the cultural differences between a developing country like India with developed countries like UK & USA.

**Elements and Benefits of UX design**

User experience design is the approach to have a positive impact on the overall experience of a user with a product or application. It is a multi-disciplinary field combining an array disciplines like psychology, anthropology, sociology, computer science, graphic design, industrial design and cognitive science. The basic elements that contribute to an effective UX design are – branding, usability, functionality and content. A good UX design has the potential to increase customer loyalty toward a product, making support and maintenance easier and managing competition from others.

Cultural sensitivity plays a vital role in UX as business enterprises expand their customer base across national and cultural boundaries. A deep understanding of cultural values and patterns are required to make a user experience better. A classic example was the failure of American cars in Japan as the car sizes were not appropriate for Japan. The steering wheel was on the wrong side, seat sizes and adjustments did not fit the average Japanese, engines weren’t designed to run on Japan’s lower octane fuel and performed poorly, R, D and L on the shift had no meaning for the Japanese and repairs required unusual English tools.

Technology is always realized in a cultural perspective and users interpret products based on their cultural backgrounds and values. Many anthropologists have come up with various cultural models that provide clear ideas to understand cultural behaviors. Such models help in integrating cultural contexts in UX design.

**Geert Hofstede’s Cultural Model and UX**

Geert Hofstede, a social psychologist and anthropologist is a pioneer in his research on cross cultural groups and organizations. He proposed that people differ according as how they measure up on the five dimensions. The five dimensions are:

- Power Distance Index (PDI)
- Individualism vs. Collectivism (IDV)
- Masculinity vs. Femininity (MAS)
- Uncertainty Avoidance Index (UAI)
- Long-term vs. Short-term orientation (LTO)

Hofstede’s listed 76 countries and regions in his study. Cultures are compared with each other and the country scores on cultural dimensions are purely relative. Hofstede’s database analysis can be of great help in designing the user experience for different cultural audiences. For example, if one designs user experience for India, one can check the values as per Hofstede’s analysis and get a good understanding of the cultural sensitivities. Then this information can be leveraged to work on content, branding, usability and functionality for an effective user experience.

**Cultural Dimensions across US, UK and India**

A comparative study between developed western countries with developing countries will provide a perfect picture of cross cultural differences. India is considered to be one of the most competitive and rapidly growing markets. In the following sections user experience across USA, UK and India will be analyzed vis-à-vis the five dimensions of Hofstede’s model [Fig. 1].
Power Distance Index (PDI)
Power distance refers to the extent to which less powerful members expect and accept unequal power distribution within a society. Geert stressed that high PDI countries tend to have centralized political power and have a tall hierarchical structure where leaders are more prominent. Inequalities are part of the culture. Whereas, countries with lower PDI have a flatter hierarchical structure where people expect equality.

A typical Indian website has the leader’s image and message on the homepage. India with a high PDI (77) gives more priority to its leaders and authoritative figures. A glance through the websites of Indian universities clearly reflects that the sites lay more prominence on lead figures in the form of a prominent image of the Vice Chancellor or a message from a person in high authority. While university home pages in countries, US and UK with low PDI values give more priority to students and their activities instead of focusing on authoritative figures.

So while designing UX for high PDI cultures the focus should be more on the authoritative figures and their messages, awards, recognition, etc., to build a tall hierarchical structure. But while designing for low PDI cultures, the focus should be on people and group activities and the content can avoid rigid structure.

Individualism vs. Collectivism (IDV)
In individualistic culture, everyone is expected to take care of self or immediate family members. Individual’s social and economic concerns are more important than society. People from this culture value personal time, freedom, personal achievements and rights.

Collective culture implies that people are integrated from birth and form into cohesive and homogeneous groups. Collective culture focuses on group priorities, harmony, laws, consensus and loyalty over personal interests. India’s low IDV value reflects the fact that India has a collectivist culture. For instance, the home page of Indian Railways’ website displays the rules for passengers and displays news on awards or achievements. Such websites stand for the fact that Indian websites focus more on rules, regulations and rewards in their UI.

But in high individualistic cultures like US and UK, it is observed that their railway websites focus more on individual passengers. They provide features like ‘search my train/journey’ and travel guides on their homepages for the convenience of travelers.

Such instances indicate that a UX design for countries with high IDV should focus on individuals, personalized navigation, user guides and privacy concerns. On the other hand, countries that have a low IDV value should have user experience that is more focused on group activities, rules and regulations, rewards and recognition, etc. The low IDV culture needs a traditional and passive approach and a design with static choices.

Masculinity vs. Femininity (MAS)
Masculinity and femininity in this context refer to the gender roles and not to physical characteristics. Hofstede defines masculinity
as assertiveness, strength and competitive spirit and femininity as family values, modesty and quality of life.

In cultures with high masculinity value, the traditional gender roles are strictly followed. But a culture with high femininity value tends to collapse the gender distinction and leads to overlap of gender roles. For example, people in feminine culture believe that both men and women will behave in a modest and tender manner whereas, people in masculine culture believe that only women will be modest and tender while men will be assertive and tough.

Table 1 reflects that Indians pay more attention to family values and quality of life than individual assertiveness or competitiveness in comparison to other countries like US, UK and Japan. Thus, we can infer that while designing UX for masculine cultures focus should be on recognition, achievement and challenges, full control to content and navigation. On the other hand UX in feminine cultures can focus on quick results, fewer tasks, user manuals, guides and support, and aesthetic appeal.

<table>
<thead>
<tr>
<th>Country</th>
<th>Masculinity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>56</td>
</tr>
<tr>
<td>US</td>
<td>62</td>
</tr>
<tr>
<td>UK</td>
<td>66</td>
</tr>
<tr>
<td>Japan</td>
<td>95 (highest)</td>
</tr>
<tr>
<td>Sweden</td>
<td>5 (lowest)</td>
</tr>
</tbody>
</table>

Table 1: Masculinity Index
Source: www.geert-hofstede.com

Uncertainty Avoidance Index (UAI)
Uncertainty avoidance index refers to the degree of anxiety over uncertain events, objects or threats. High UAI culture tends to be busy, emotional and aggressive in nature and looks for structured content and less indent for complex or sudden events. Low UAI culture is easy going, quiet, controlled and curious about changes.

UK has a very low UAI of 35, whereas US and India score 46 and 40 respectively. The site of a leading airlines company with its operations in US, UK and India clearly reflects this dimension. It was noticed that for the UK site of the same airlines there is an option called ‘not sure where or when’ for travelers who are unable to decide the location and time of travel. This option is not available in the US and Indian counterpart sites of the same airlines. This reflects that UX changes as per the countries UAI dimension. In high UAI culture, navigation should be kept simple, models should be used to reduce errors, ambiguity and results should be displayed prior to tasks and there should be no redundant cues. But for UX in low UAI culture there is room for complexity and risks, information should be maximized and navigation should be less controlled.

Long-term vs. Short-term Orientation (LTO)
Long-term orientation societies tend to search for virtues, look forward to future and practice patience to get the right results. Whereas the short-term orientation societies look for absolute search and are in a rush get the quick results. The petroleum companies of India (LTO: 61), UK (LTO: 25) and US (LTO: 29) main pages can be used as a reference to see the differences.

UK and US have a very low LTO value and these countries are more focused on immediate results like dividends and quarterly results. But, as India is a high LTO culture, long-term goals are projected on the homepage. This LTO dimension analysis suggests that UX for low LTO cultures should focus on immediate results and on breadcrumb navigation whereas UX for high LTO culture should focus more on long-term gains. This analysis also reflects the fact that mostly Indian's have an inclination...
Conclusion

Cultural norms play an integral role in marketing, product selling and designing. Cultural background has a great impact on user experience. While designing UX for a country it is important to gather cultural awareness that in turn can help to increase user satisfaction. Products that are culturally adapted and marketed accordingly find more acceptance from users as they find the products to be closer to their way of living. Strategies based on the user’s cultural background will help companies optimize their sales in different regions. While some countries prefer traditional and hierarchical approach there are other countries that focus on novel and non-hierarchical approach. Each has its own set of requirements and aesthetic expectations. A successful UX design takes stock of cultural dimensions and breathes life into user experience and business.
References

2. www.geert-hofstede.com/countries.html

Authors’ Profile

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Online social media continues to evolve and mature and has proven its ability to drive traffic. It is increasingly becoming a place to foster one’s personal and business relationships and brand building. Today, online social media sites offer a host of applications that help to connect with friends, share photos, chat, listen to music, watch videos and play games and puzzles. At the same time it has expanded its horizons to create and expand business relationships between various individuals and organizations. Social media has significantly grown as a tool to advertise, sell products and services and create brand value. Business leaders are using social media as a tool to communicate with employees and customers bi-directionally, communicating important announcements and getting their feedback to design new customized products.

How is brand value related to social media? Online social media is a vibrant forum for companies to work on their brand value. Brand is nothing but goodwill earned by the company through word of mouth or customer
reviews. The new age customer is more likely to pay for a brand when it is recommended by a friend or colleague, rather than falling for generic advertisements by the same brands. As per socio-demographics 2010 data, Twitter has 106 million users, of which 27 million log in every day. 25% of Twitter users follow specific brand and 67% of such brand followers finally make a purchase. Facebook has 500 million users of which more than 100 million log in every day. 40% of the total users follow specific brands whereas 51% of the brand followers make a purchase [Fig. 1].

Brand value is reckoned when two or more businesses sell similar products and target the same audience. Brand optimization plays a crucial role in building brand value as it uses minimum resources for maximum brand recognition. The appropriate social media website for brand optimization depends on the type of product one is trying to promote. People and organizations opt for different types of social media like micro blogging (Twitter), social networking site (Facebook), professional networking site (LinkedIn), etc., based on the category of the product [Table 1].

### Brand Optimization and Social Media

Consumers have a variety of choices through multiple avenues and one of the most effective avenues is social media. The success of marketing, advertising and branding activities on social media depends on the acknowledgement and acceptance by consumers. To be able to connect to the consumer’s behavioral pattern on social media and gain acceptance, it is important to understand why a consumer logs in to a networking site.

**Useful:** On a social networking site, one can keep in touch with friends, join communities of common interests and feel a sense of belonging. Information on common issues is

<table>
<thead>
<tr>
<th>Networking Site</th>
<th>Mode of promotion</th>
<th>Mode of networking</th>
</tr>
</thead>
<tbody>
<tr>
<td>LinkedIn</td>
<td>Technical and detailed description of the product</td>
<td>Professional network. Products like HR or software tools are promoted</td>
</tr>
<tr>
<td>Twitter</td>
<td>Informal and relevant information that the target audience can understand</td>
<td>Informal discussions, celebrity news, etc. Products like baby and beauty products are promoted</td>
</tr>
<tr>
<td>Facebook</td>
<td>Formal information with useful features like original product website</td>
<td>Spend leisure time with online friends, music, videos and games. Regular products like Nike, GAP, etc., are promoted</td>
</tr>
</tbody>
</table>

**Figure 1:** Brand Followers in Social Networking Sites

**Source:** www.digitalsurgeons.com

<table>
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<td>Technical and detailed description of the product</td>
<td>Professional network. Products like HR or software tools are promoted</td>
</tr>
</tbody>
</table>

**Table 1:** Brand building on Networking Sites

**Source:** Infosys Research
also exchanged on these sites. It also acts as a platform to share digital content like photos and videos and to listen to one's favorite music.

Desirable: Online social sites provide a joyful experience to an individual. The desire to increase one's net worth and enhance professional relationships act as natural pull strategies for frequent visits to the sites. Also, social sites are offering new content and functionality every day and that generates curiosity among users to explore and desire for new things.

Relaxing: Typically, when an individual comes home after a day's work, she looks around for something relaxing like social networking. It helps the individual to unwind and rejuvenate. One can read up humorous content, interesting news items, photos and also share similar such content.

Comprehensive: Social sites provide personalization features. One can get a comprehensive view of all content she wants to see like news, photos, jokes, updates from friends, announcements from tagged companies or organizations, etc., on the same web page.

UX and Brand Building
A good and a bad user experience can drive the growth of social media. Let us examine the four most important contributors to a good user experience in social media.

Simple and easy interface: ‘Less is more’ is a phrase that is catching up fast. Simplicity and ease of use sit at the core of a good user interface. The significance of keeping the interface simple is to keep the user focused and avoid distractions. For example, whenever a user signs up for a social networking site, the registration form should contain only the bare minimum essential data like name, email and location and leave the rest for the user to fill-in once the account is created.

Visually appealing and separated content: The content on the web page should be easy to scan, read and perceive. The content should be discrete so that it is easy to comprehend. For example, Facebook allows all friends to comment on photos. This feature is visually appealing and comments posted by friends should appear separated and clear.

Variety of applications and features: Social media sites should provide multiple applications both at personal and business levels. At the personal level there can be applications to share photos, music, videos, games, etc., whereas at the business level organizations can advertise and increase visibility of their products and services.

Search Engine Optimization (SEO): Almost all online activities within social media sites begin with a search online like search for friend, colleague, product or organization, feature etc. Thus, SEO is a very important aspect in UX. Usually, the first impression one has about a person, product or an organization is based on its search results. Thus, search engine result plays an important role in increasing brand value in the user’s mind. Whenever a user types for a brand or product in the search box of a search engine and gets a quick result, it raises the level of confidence on the brand in the user’s mind. Similar such search results will then appear more frequently to other users.

Social Media in the Banking Sector
Today, most of the banks, financial institutions and non-financial institutions are exploring social sites not only to advertise their product or build brand but also to provide better services and resolutions to queries. Most of the large financial institutions have their dedicated applications and web pages on social sites like Facebook or Twitter. The users not only get information on the companies from these sites but also get direct services.
on products from the business web pages on the social media sites. Many banks are seen offering functionalities like loan application, calculators, live chat, etc., over these social sites.

American Express has a dedicated application and web page on Facebook. Customers not only find relevant information about their cards on this web page, but can also redeem their reward points to purchase digital content like music, online videos or games. American Express' 'Link, Like, Love' application on Facebook provides deals, access and user experience based on the likes, interests and social connections of card members and their friends. Card members can link their cards to the program and choose their favorite deals. American Express sends statement credits as the card members shop online or in stores.

Also, American Express and Facebook teamed up to enable American Express card members to advertise on Facebook using membership reward points. With such addition of membership points as a payment option, business owners now have a powerful and novel way to build their businesses through the rapidly growing field of social media advertising. This new option comes as a boon to organizations that make use of multiple social media forums as different social sites serve different purposes and target audience could be different as explained in Table 1.

Citibank US has a webpage on Facebook that promotes regular quiz, company offers, etc., for brand building, advertising and new customer acquisition. Also, Citibank US posts job openings and referral programs on LinkedIn regularly. Many such multi-national banks have moved beyond traditional banking products and are exploring social media to offer innovative products or services to increase revenue. Many large banks have announced plans to offer peer-to-peer payment functionalities and business-to-customer (B2C) payments like soccer club fee, friend fund or group buy payments through social media. User experience of such functionalities will play a very critical role in choosing a product or a service provider, bank or a financial institution. Banks are leveraging social networking sites to a large extent to optimize their brand image and to provide value addition services with versatile banking. Similarly, banks and financial institutions can win new customers based entirely on a user's experience on the bank's web page or application on social networking sites.

UX Features for Social Media and Brand Optimization
Advertising and brand optimization on social media is not devoid of challenges. There are issues that have to be addressed before the experience is made worthwhile, pleasurable and safe for the users. Some of the pertinent issues are shown in Figure 2.

A few UX features can address the challenges on social media and enhance user experience to gain better brand optimization.

Higher brand visibility through content optimization: Content optimization plays a critical role in making user experience desirable and providing a higher brand visibility. Content and features should be comprehensive and visually attractive to generate brand appeal among users. This can be made possible by relevant addition, elimination, automation and relocation of user experience process steps. For example, hyperlinks need to be placed on almost every page either for navigation or to point to some brand/business link. The size of the hyperlinks should be based on the action intended from the user.

Brand follow-ups through interactive and enhanced applications: With the advent of smartphones and tablets like iPads, people are accessing their social accounts anytime from anywhere. Facebook, Twitter and
Security and Identity Theft: Most of the social sites contain personal details of users. Though there are privacy options available, identity theft is increasing by leaps and bounds.

Real-time Update Feature: Users expect real-time updates on their home pages and adding this feature on the webpage is a huge constraint.

Content Overload: Too much content on social sites is working against user experience.

Personalization: It is critical to allow personalization of content on social sites. This is one of the biggest design challenges for UX.

LinkedIn have created applications for users to access from smartphones like iOS and android as well as tablets. To reach the users of smartphones and tablets, organizations should design applications for optimum and enhanced user experience keeping touch screen, resolution, color quality, etc., in mind. Users should be able to follow desired brands and business organization updates regularly and easily. They should get real-time updates and notifications of desired content. Also, user experience for making any payment transaction through social sites should engage the user interactively until the transaction is complete. This will help in increasing brand value in the eyes of the user.

Customer analytics and personalization: Customers want customized solutions in every sphere of online networking including personalization of the web pages, accessing details, privacy settings and brand follow-ups in social sites. Each customer wants to view her profile, the contents and business pages in a particular way. Personalization of following specific brands and payment methods could be very useful and attractive to users as no two users have the same preference or habit. Thus, customer analytics plays a very crucial role in finding user login pattern, access behavior, browsing pattern, brand follow-ups and purchase pattern.

Identity and data security: Security and identity theft from social sites is the prime reason why people refrain from using these sites, especially for business or payment purposes. The number of identity theft incidents from social sites is increasing with each passing day. Social sites provide a single login id to access an account that can be easily hacked by a fraudster. Social media sites should focus on creating double authentication and higher security measures that can boost the confidence of the user to partake in business activities, especially high value payment transactions.
Conclusion

Online social media is all set to become advertisement and e-commerce hub in the near future. A useful, desirable, relaxing and comprehensive user experience is the key to faster adoption of social media and brand creation over social sites. The day is not far when social media will not only drive an organization’s brand creation but also become one of the most important sales channels. Today more and more UX designers are spending time and effort to research and understand customer behavior to come up with personalized and appealing content that will increase brand follow-ups and benefit users, organizations and the social networking sites collectively. With the widening horizon of social media world, UX features like personalization, content optimization, interactive applications for remote devices, and simple access with higher security will emerge as potential game changers for social media growth and brand optimization.

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