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Title: Tablet computing and apps: A methodology for improved business productivity

Abstract:

Mobile tablet devices such as the Apple iPad and Samsung’s Galaxy Tab are changing the way firms do business by improving internal processes and providing customer service. The paper investigates the unique capabilities of tablet devices and how tablet applications leverage these devices unique capabilities supported by U-Commerce theory. An approach to tablet application development for firms where the context of device and applications use is developed and supported by frameworks that are grounded in the marketing literature. The paper considers how mobile tablet devices can work within a firms existing ICT infrastructure to have a valuable impact on the firm.

Keywords: Tablet device integration, applications, U-Commerce.

Author Details

Article Author (and corresponding Author): John Bredican

Institute: KTH Royal Institute of Technology, Sweden.

Department of Industrial Economics and Management. Division of Entrepreneurship and Innovation.
Royal Institute of Technology (KTH)
KTH - Lindstedsvagen 30, 100 44 Stockholm, Sweden
Ph: Mob +44 7799588484 Ph: + 44 (0)20 7374 2276

Email: john.bredican@indek.kth.se

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Introduction

Compact, lightweight, highly portable with the flexibility to perform computer functions as well as take photos and movies, disruptive technologies such as tablet computers are changing the face of business computing. In so doing tablets are increasing productivity and customer service levels. Tablets are very successful hybrid of two established portable computing devices (the laptop computer and the smartphone) but the functionality of tablet devices excel in unique ways. Understanding how, where and when to use tablets in business to improve productivity and services requires knowing the role of tablet computers in an information systems strategy, understanding the various technical capabilities of these devices, the influence of context in personal computing, and taking a vicarious learning approach to developing applications for tablet devices.

There are currently four major operating systems that are available for tablet PC’s including Apple iOS, Google Android (including the modified versions), BlackBerry Tablet OS and Microsoft Windows 8/RT. The website CNET lists over 1,000 different tablets (CNET, 2015) with every major technology brand (including Samsung, Acer, Barnes and Noble, Amazon, Apple, Asus, Creative, Sony, Levono, Toshiba, Sharp, LG, KOBO, HP, Archos, Dell, Motorola, BlackBerry, Panasonic, HTC, and Fujitsu to name a few) having launched devices into the market. Differentiation of mobile devices is increasing but how users perceptions of these devices differ according to size and convenience is virtually unknown. Okazaki and Mendez (2013) contend that this type of differentiation among portable devices is expected to be of emergent importance and that advances in the design and usability of mobile devices, proliferation of different sizes together with increasingly competitive pricing can all be expected to create greater business needs and opportunities. Apple, having identified this opportunity, recently launched a larger size iPad targeted predominately at business applications rather than the consumer market.

In a time of a rapidly expanding mobile environment, it is crucial for researchers and practitioners to better understand how mobile business can create value for
organizations. However, it is not yet clear how mobility can affect firms, or what the implications of mobile technology are at the organizational level (Picto, Belanger and Palma-dos-Reis, 2014). This paper details the unique capabilities of the tablet, and examines the human-machine interaction capabilities with a focus on B2B business applications. A methodology for developing “apps” or applications for tablet devices is proposed.

The paper is organized as follows: First, a brief introduction to the tablet is provided and the features that make a tablet unique are considered. Second, the notion of U-Commerce is applied to explain application utility. A six-step framework for identifying and developing tablet applications in business is then developed. The paper concludes with a discussion of some further implications for management and avenues for future research by information systems scholars.

**What differentiates a tablet?**

Most everyday computing needs, such as accessing the web, checking and sending emails, connecting on social media, recording memos and leveraging a variety of apps that can be used for productive business use or personal leisure, do not require local storage or massive computing power. All of these activities can be accomplished on a tablet device - a small portable computer that accepts input directly on to its screen rather than via a keyboard or mouse, that has relatively small storage and is battery powered. The tablet has features that distinguish it from a personal computer or smartphones:

1) **Portability.** A tablet is slender and light. Even compared to the smallest and lightest of laptops, a tablet is notably thinner, lighter and more portable. Unlike most laptops that require their own luggage, a tablet fits easily into most bags and can fill the role of a laptop and perform most of the same functions.

2) **Functionality.** Although a tablet may lack the breath of functionality of a laptop, it can also take photos, shoot videos; connect users through video chat and conferencing in a more versatile way due to its portability. Although these are technically feasible on a laptop, in practice it is not as easy or convenient.
The accelerometer and gyroscope (a feature found on smartphones) sets the tablet apart from a PC or laptop. Most tablets come equipped with an accelerometer, which measures its rate of movement and senses the direction in which the tablet is moving. This feature allows the tablet to control other device movements or motions, for example a remote control helicopter. The gyroscope function found in many tablet devices measures or maintains orientation. The motion sensing accuracy of the tablet is greatly enhanced by the accelerometer and gyroscope functions (which are often leveraged by gaming apps). GPS (Global Positioning System) is a function that can provide the user and applications on the device with reliable and precise time and location information in all weather conditions, at all times, anywhere. Data can be stored on the tablet.

3) Accessibility. The tablet screen is smaller than most PC’s or laptops but larger than smartphones. This makes them ideal for reading with the average tablet diagonal screen size between 8.4 and 10.1 (inches). Users also have more usable space to get real work done. Although use of the virtual keyboard can take up significant screen space, tablets still trump smartphones in productivity.

A tablet is uniquely easy to use, and can be operated entirely through touch. Most applications generally do not require a keyboard, mouse or other pointing device. The highly intuitive touch-screen interface allows users to achieve a great deal without having to enter data or click using a mouse. The device does not assume users have literacy or keyboard skills, making it highly accessible to the very young and old (Pitt, Berthon and Robson, 2011).

A tablet is easily switched on and used in a wide variety of environments, as it is always on or can be instantly turned on and off, with no boot-up time and no waiting for shutdown, a feature not found on most laptops. With most users consuming mainly media on tablets, having excellent screen resolution allows users to operate a tablet more effectively.

Additionally, a tablet is capable of running unique software apps that enable users to complete a wide variety of complex tasks simply and efficiently. Apps on-screen make navigation highly intuitive, so that users don’t need to spend
much time learning how a piece of software works. A tablet is also useful for viewing media, such as slide presentations and video. As an e-reader tablets can access an entire library of books and magazines on the go, again technically possible on a laptop or smartphone, but not very practical.

4) **Individuality.** Like smartphones and unlike many office personal computers and even laptops, a tablet tends to be owned and operated by one individual (Pitt, Berthon and Robson, 2011) whereas more than one individual very often uses a PC or laptop. Tablets can also be uniquely configured to the owner, especially with regard to the choice and position of applications on the screen.

5) **Durability.** With a longer battery life (on average approx. 10 hours) than most laptops, a tablet can be used continually throughout the working day, and can also be recharged relatively quickly.

**Business benefits from the adoption of the tablet**

The tablet device offers an immediate anytime anywhere multi-way connection to the Internet, apps, other smart devices and the environment. 97% of IT professionals surveyed by Dimensional Research, a marketing analysis company, think this level of access makes employees work more effectively (Dillon, 2014). Significantly, Apple and IBM announced on July 15, 2014, an exclusive partnership that teams the market-leading strengths of each company to transform enterprise mobility through a new class of business apps – bringing IBM’s big data and analytics capabilities to iPhone and iPad (Apple 2014).

There are many reasons for the adoption of tablets by businesses. Firstly, the younger generation is growing up with smart mobile devices and is bringing them into the business world. Companies are progressively allowing executives and other employees to buy devices of their choosing to connect to company operations [Bring Your Own Device or (BYOD) programs].

Secondly, the physical characteristics of the tablet for employees have also played a role in attracting corporate customers. Equipped with a battery life that will last an entire work day which is better than most laptops, and the ability to turn on almost instantly; employees no longer have to wait while their laptop
boots up and be hampered with recharging the battery. Tablets are also lightweight (from only 375 grams according to CNET, 2015), and are therefore easy to carry around between offices, sites, and meetings.

Thirdly, it is beneficial to anyone who is required to stand on the job (e.g. anyone who uses a clipboard, or travels), as it is light enough to be carried around while working and walking.

Finally, tablet size is also important: it is large enough to comfortably read reports, or flip through presentations. In contrast, mobile screens are too small to share or encode information. The benefits of user ease of use equate to increased productivity – up to 20% or more (Hernandez, 2014).

**U-Commerce and tablet App Development**

To appreciate the potential and utility of mobile apps and table devices, application of the U-Commerce theoretical framework is useful. Recognizing an increasing pervasiveness of networks, continuous wireless communication, and data exchange, Watson, Pitt, Berthon and Zinkhan (2002, 2004), proposed the term U-Commerce. U-Commerce is the third phase in the evolution of E-Commerce (Electronic Commerce); and M-Commerce (mobile commerce). The latter two terms do not capture the essence of today’s networked environment, in which networks (the Internet, cellular phone networks, satellites and the pervasiveness of WiFi), are everywhere and always on.

U-Commerce is based on the notion of a continuous flow of resources and information through the networked eco-system along all possible connections of consumers, firms and information sources. U-Commerce as defined by Watson, Pitt, Berthon, & Zinkhan (2002) is “the use of ubiquitous networks to support personalized and uninterrupted communications and transactions between a firm and its various stakeholders to provide a level of value over, above and beyond traditional commerce” (p.336). These authors argue that four dimensions characterize U-Commerce namely: ubiquity, uniqueness, unison and universality. These are described below, and illustrated using apps as micro-case studies.
Ubiquity
Ubiquity represents the ability to be perpetually connected, and the integration of human-computer interaction into most devices and processes. Ubiquity is defined as “access to information unconstrained by time and space” (Junglas and Watson, p.578). In a tablet application, ubiquity refers to the capability of users to always have connected access to information regardless of where the users happen to be or when they choose to access information. Constant connectivity is a central component of U-Commerce. GSM, 3G, 4G LTE, Wi-Fi – are nowadays ubiquitous in most nations, where telecommunications and other infrastructures support the networked tablet.

Micro-Case:
Documents To Go is an all-in-one application with support for Microsoft® Word, Excel & PowerPoint, PDF, Apple iWork and other files and attachments. It includes a desktop application for Windows and Mac to provide 2-way file synchronization and also supports Google Docs, Box.net, Dropbox, and SugarSync. The application allows users access, edit and create Microsoft® Word, Excel and Powerpoint® files regardless of time or space (Documents To Go. Dataviz. 2013).

Uniqueness
Uniqueness is defined as “knowing precisely the characteristics and location of a person or entity” (Junglas and Watson p.579). Uniqueness is the identification of each user or customer and recognizing their unique identity, current context, location and needs. Customized unique information is delivered or distributed to or from the individual and allows the user to access and generate more meaningful contextualized information than a static, generic interface would.

Micro-Case:
TripLog helps users to track mileage in their automobile, negating the need to rely on paper logs, or failing to have all of the information needed for expenses related to travel (Techrepublic, 2013). The app tracks vehicle mileage and locations using GPS. Other features ideal for business include: auto starts when
the device is plugged in and once the user drives at more than 5 mph the app starts the GPS to track the mileage. It also tracks fuel economy and expenses and can import locations from phone contacts and Google Maps. The app also comes in a business solution that can manage an entire fleet or team (Triplog 2015).

**Universality**

Users generally want fewer devices with more functionality for reasons of efficiency and ease, and the goal of universality is to “overcome the friction of information systems’ incompatibilities” (Junglas and Watson, p. 580). In simple terms they want their various devices to work together, everywhere and anywhere. The tablet device has a high level of integrated functionality such that it can serve as a phone, PDA, web browser, music player, camera, GPS, and more. For example, a business tablet user can search for airline flights and hotels (Internet browser), then click on the displayed email to book the hotel, and then use the map function (GPS) to get there. Compared to other connectable devices that offer multitasking, tablets can stay connected through cellular networks and Wi-Fi and are considerably more connected than other devices such as PCs and laptops.

**Micro-Case:**

OpenScape MobileConnect is an enterprise FMC/UC (Fixed-mobile convergence / Unified communications) integration solution that seamlessly unifies fixed enterprise VoIP (Voice over Internet Protocol), VoWLAN (Voice over wireless local area network), applications and cellular mobility bringing the full functionality of the world’s most advanced unified communications solution to the tablet devices and smartphones (itunes Openscape, 2013).

MobileConnect consists of two components: First, MobileConnect Server located at a central site, sitting on the wired network between the WLAN and the SIP PBX (Session Initiation Protocol, Private Branch Exchange) it continually monitors and manages mobile user sessions regardless of whether they are on the corporate or public network.

The second component, Mobile Client, is software that resides on the dual-mode handset and works with the MobileConnect Server to navigate enterprise-cellular
exchange. Besides FMC telephony services, the OpenScape Mobile Client supports instant messaging features to stay efficiently connected with colleagues, independent of the access network (Wi-Fi or Cellular) and the device used and has application integration via Click to Dial from every application on the Mobile Phone (Calendar, Email, Contacts, Salesforce.com or other integrated applications) (itunes Openscape, 2013).

**Unison**

Unison concerns “information consistency” independent of access point or time (Junglas and Watson, p.580). Consumers want synchronicity across all connected devices: Tablet, smartphone, PC’s, Laptops and other web-based access points. Data integration provides users consistent and full access to relevant sources of information such as calendars, documents, list of contacts or emails required, independent of device and location. Information gathering is often coupled with a sense of timeliness, and conflicting information is generally seen as inefficiency. Relevant sources of information such as calendars, documents, list of contacts or emails are unified, rather than uncoordinated, conflicted or out-of-date, regardless of point of access. Unison refers to consistently synchronized access to the user’s data in an interactive way (i.e., the ability to both pull data from the server to the device, and push data to the server).

**Micro-Case:**

OmniFocus brings task management to the user’s fingertips. The app gives users the ability to keep track of tasks by project, place, person, or date (itunes Omnifocus, 2013). The user’s essential information is always at hand, whether it’s a shopping list, agenda items to discuss at work, things to do at home—whatever is needed. OmniFocus includes the features to organize tasks, builds task lists based on the user’s current location, capture voice notes and pictures, and synchronize with a PC via cloud or WebDAV servers.

**An Approach to tablet App Development for Organizations**

A key question facing IS professionals, marketers and others concerned with the formulation and implementation of IS strategies within organizations, is how
tablets, and more specifically table applications or apps can be developed in order to create value. While the solution to this might lie in serendipity, here it is argued that a defined process can be followed that will result in the development of apps that will create value and attain the organization’s objectives. When developing tablet apps for business, the first step for decision makers is to identify, understand, and explore ways that exploit the unique characteristics of tablets (detailed above). The model in Figure 1 illustrates a way for managers to think in a structured way about the identification and development of apps for tablets in business.

**Figure 1: Methodology for Developing Tablet Applications for IS Strategy**

How information is saved or communicated might be of interest to IS professionals, however it is how users interact with information and the context in which they do, that is key to a well-designed app. Thus, the type of interaction the app will facilitate and the context of that interaction are critical to the value it will deliver. Applications present value to users in key areas such as mobility – the user can conduct business anytime and anywhere, and flexibility – the user can engage in other activities such as travelling while conducting business or transactions (Fui-Hoon Nah, Siau, and Sheng, 2005). Additional benefits include
ease of use and speed with which information can be accessed, as a well-made app can provide a far better user experience than even the best websites. Apps provide convenience, as the device tends to be within arms-length of the user for long periods of time. Apps provide security as they provide safe storage of personal data so that users can save time, and they allow users to purchase items of their choice, from anywhere and at any time. Apps provide entertainment or stress release via games apps, navigation via maps and local information, and can be time saving (e.g. reminder calendar scheduling). In the following section the 4 I’s framework is used to further the discussion of information interaction.

Gebauer, Shaw, & Gribbins (2010) categorize mobile IS functionality on two dimensions, with the primary functionality dimension ranging from information access to data processing, and the secondary dimension being that of interaction between user and IS (i.e. whether there is one-way or two-way interaction). Building on Gebauer, Shaw & Gribbins (2010), Pitt, Berthon and Robson (2011), propose that there are four types of information interactions on any information systems device (of which the tablet is one), the “4-I’s”: Inscriptive, Informative, Interactive, and Isolative.

The 4-I’s Framework of Information Function on the tablet

**Inscriptive Interactions**

This is concerned with the inputting, or entering information. Koivisto and Urbaczewski (2005), argue that one of the key challenges of mobile device and system manufacturers is to identify an optimal input method for their devices. Typing in information via the use of a touch-sensitive screen for tablets is an excellent method of achieving this, but information can also be entered via recording and saving a voice memo as an audio input. Although tablets are typically used more for consuming information than for entering information, the ability to input information is important. In a workplace context, the ability for a worker to efficiently and effectively input the right instructions is the crux of the inscriptive ‘I’.
Informative Functions

This is essentially output by which information is provided to a user. Watching a video, reading script, or listening to a voice memo, are all examples of the Informative Function. Collecting information (Inscriptive) or the sending of information (Informative) can be one-way (a text message with no response) or a two-way communication (where the text is acknowledged). The dimension of direction of interaction referred to by Geubauer, Shaw, and Gribbins (2010), is reflected in the two I’s of Inscriptive and Informative.

Interactive Functions

The interface of the user with the information describes the Interactive Function. Manipulation of information is possible and examples of this type of interaction include editing a script or adjusting an image. This echos Geubauer, Shaw, and Gribbins (2010), second dimension (information access/data processing).

Isolative Functions

This is the storing of information for later use, and from a user perspective this is essentially a passive function. Figure 2 depicts the four quadrants of the 4-I’s Framework (Pitt, Berthon and Robson, 2011), using a simple example.

Figure 2. The 4-I’s Framework of information function on a Tablet device
**Context is Crucial**

One of the most characteristic features of a tablet computer is portability, which when combined with applications creates significant value over and above the functionality of information. A tablet’s portability means that the context in which it is being used can constantly change. Dey, Abowd and Salbar (2001) observed that context typically has to do with the location, identities of nearby people, objects, and changes to objects, and define context (with specific regard to IS) as ‘any information that characterizes a situation related to the interaction between users, applications, and the surrounding environment’ (p.97).

Understanding context with regard to mobile devices has been emphasized by various IS scholars (e.g., Junglas and Watson, 2006). Gutheim (2011 p.66); (see also Zhan, 2003) notes, “Context-enabled mobile applications are considered to provide a richer experience and to enhance the user interaction by acquiring information that allows the identification of the user’s current situation.” Enabling mobile devices and applications to adapt automatically to the changing environments enhance the user experience. These authors argue that applications for mobile users should take advantage of contextual information, such as location or orientation, to offer greater service value.

Pitt, Berthon and Robson (2011) argue that taking advantage of contextual information enhances the value of information in two ways: Contextive and Contextual. Contextive information is information about context, that is, it is relevant to where a person is, or what they are doing or is otherwise contextively reflective. Contextual information is information for the context, when information is relevant to where a person is, relevant to what they are doing, or contextually relevant in other ways. A simple example of an excellent app illustrates Contextive and Contextual information:

The IMEX American app is a guide to the IMEX America conference. A great deal of the information in the App is Contextive, that is, it gives a lot of information about the conference: Who the exhibitors are, speaker profiles, a list of all the events, their dates, times, location and description.
The app also provides information for the particular visitor, for their exact circumstances at the event. Users can access their schedule to view, add and reschedule appointments, view booth staff schedules, and re-assign appointments to booth colleagues, connect and exchange with other attendees as well as providing an interactive map.

The concepts of contextive and contextual information can be very useful for generating ideas for tablet device apps. Figure 3 illustrates that an information system can be a two-dimensional combination of contextual and contextive properties.

First, at its simplest level, an information system can be neither contextive nor contextual (i.e., it is acontextive and acontextual). Second, it can be contextive – that is, it can tell a person something about the context in which they find themselves. Third, it can be contextual – it can be relevant to the individual for the situation in which they find themselves. Finally, it can be both contextive and contextual. Figure 3 illustrates these principles using an example.

A map and all the data associated with it can reside on a database – for example it can be stored on a tablet device, but it is neither contextive nor contextual. Using the Google Maps app, and the tablet’s GPS capability, the user can find out about their location (contextive information) for example on the corner of Beech Street and Long Lane, London. Using the map section of Google Maps, and the tablet’s GPS capabilities, the user can find the closest fast food restaurant for them (e.g., a Burger King, just off Long Lane). The information is now contextual. Finally, a person might be in a hurry but wants to avoid traffic or transport delays. Using the Transport for London (TFL) app (which integrates maps, GPS and reports of transport issues), a person can identify what transport options are available and potential issues (contextive information), about the area).
Key Dimensions: The Three C-Abilities

The choice between the most suitable and applicable business applications for various devices can be rather simple from a customer/consumer perspective (e.g. an uncomplicated app for a smartphone, a more comprehensive app for a tablet). However, the choices for the IS decision maker and the firm will be more complex. Devices such as laptops, smartphones and tablets are portable and share many of the same functions. A decision criterion might need to be developed that considers and evaluates the key dimensions that differentiate these devices in the context of specific activities. Configure-ability, consume-ability, and context-ability are what Pitt, Berthon and Robson (2011), refer to as the “C-Abilities”), are three key dimensions that can determine the usefulness of the device.

Configure-ability and the consume-ability relate to the inscriptive and informative elements outlined in the 4 I’s model above. The ability to change the
configuration of both input (inscription) and display (informative) of information is referred to as Configure-ability. Consume-ability refers to the ease with which the use can interact or consume information. However, Context-ability refers to the awareness of context, such as time and place, and therefore relates to the contextive and contextual elements discussed in the context section. These concepts are summarized in Table 1 below.

**Table 1: The Three C-Abilities (see Pitt, Berthon and Robson, 2011)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure-ability</td>
<td>The ability to change the configuration of input and display of information (programmability of Inscriptive &amp; Informative elements)</td>
</tr>
<tr>
<td>Consume-ability</td>
<td>The ease with which media can be consumed, information interacted with (consumption of Inscriptive &amp; Informative elements)</td>
</tr>
<tr>
<td>Context-ability</td>
<td>The awareness of context: place, orientation, time, mood, etc (Contextive &amp; Contextual)</td>
</tr>
</tbody>
</table>

Evaluating a laptop, a tablet device, and a smartphone on these three dimensions is a useful illustration as they share a similar level of consume-ability. Given the choice of watching a video or slideshow on any of the three devices, most people would prefer a laptop or tablet because of the larger screens.

A smartphone and a tablet device are both superior to a laptop in terms of configure-ability. For example, switching from taking photographs, to recording voice memos, to taking notes is an easy process on either a tablet or smartphone; tap an icon and different applications will begin running almost immediately. However, on a laptop, programs can take longer to load and access so configure-ability is suboptimal.

Finally, the context-ability of a tablet or smartphone is greater than that of a laptop. This is partly due to the basic function of the device: Tablets and smartphones are often used as GPS devices for navigation, or for following the whereabouts of friends and family on apps such as Loopt. Tablets and smartphones are often used for simply telling the time thus replacing wristwatches. Using a laptop for such activities is unlikely due to practicality.
Differences and similarities are summarized in Table 2 (Pitt, Berthon and Robson, 2011).

Table 2: Comparing Laptops, Smartphones and Tablets on the 3 C-Abilities

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Information</th>
<th>iPad</th>
<th>iPhone</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure-ability</td>
<td>Inscriptive &amp; informative</td>
<td>Hi</td>
<td>Hi</td>
<td>Low</td>
</tr>
<tr>
<td>Consume-ability</td>
<td>Inscriptive &amp; informative</td>
<td>Hi</td>
<td>Low</td>
<td>Hi</td>
</tr>
<tr>
<td>Context-ability</td>
<td>Contextive &amp; contextual</td>
<td>Hi</td>
<td>Hi</td>
<td>Low</td>
</tr>
</tbody>
</table>

By first determining the right priority for a business application, the three C-Abilities can help to determine the right device for the task. For example, if the priority is being able to consume and interact with information, the consumer-ability should inform the decision with regard to the choice of hardware.

Vicarious Learning: Case studies of tablet apps

We often learn by modelling the behaviour of others, or what Bandura (1977), has termed “vicarious learning.” Identifying, collecting and studying good case study examples of how other organizations in similar or different industries have used tablet apps in innovative ways can inform IS professionals intending to develop tablet apps for their own business. In so doing, managers, in this next step of the development process, will be able to find the answers to questions such as ‘how might the app work in our business environment? How might it align with the overall IS Strategy, meet business objectives and develop value for our IS goals?’

In what follows, some recent cases that illustrate applications of tablet devices in business are provided as illustration. As far as possible, attempts have been made to make these cases fit the 4 I’s- and context frameworks, although it will be realized that in complex frameworks such as these, and in multifaceted business situations, there is very often overlap. In other words, one example and one situation are seldom unique to one concept.
Case Examples of Tablet devices in the 4-I Environments

**Isolative: Keeping pdfs on a tablet device rather than lugging around heavy manuals.**

Autodesk, an industrial and mechanical design software company, has produced a suite of apps including one that can provide information to the user that is relevant for what they are doing (e.g. construction data because they're on the construction site).

**Inscriptive: Medical Industry - intake surveys in doctor offices**

Digitally stored medical forms have been a reality for some time, however methods for completing forms digitally are relatively new. The Adobe Ideas app provides patients an easy to use way to fill out their medical history and contact information forms, as well as any other paperwork required by the clinic. The digital format can be immediately saved and stored by the clinic creating huge efficiencies in collecting, processing and storing information.

**Informative: Hotels and Restaurants**

Blynk (blynk.it, 2013) is a hospitality software technology company, specializing in developing apps for hotels and restaurants that run on tablets and smartphones. With apps developed by Blynk, guests are provided with a new way to review menus and wine lists, or view rooms or conference facilities. With this application, patrons can view the menu, see photographs of dishes, compare recommended wine pairings, and read restaurant or hotel information. This application is designed to be both Contextive and Contextual. The contextive content is the information about the restaurant or hotel itself, such as when it was founded and its philosophy. In contrast, the contextual content is the recommended wine pairing, or the ability to ask for a meal to be served vegan, or lactose free or order a rental car or room service.

**Interactive: Mercedes-Benz**

Mercedes-Benz has integrated tablets and apps in showrooms as early as 2010 (macworld, 2010). The customer is availed of contextually relevant to view a full-
scale 3D experience that layers information directly onto the car itself. Mercedes believes this is a more engaging way for customer to experience new models (am-online. 2012). Customers can design their own car by mixing and matching car colours, interior options, or wheel options in an engaging and interactive manner as well as share their ultimate Mercedes-Benz. For a salesperson handling the tablet, the Mercedes-Benz Augmented Reality Showroom app is Contextive: it lists vehicle information, such as the pricing associated with each feature, and allows salespeople to request additional information when necessary. Additionally, customers’ complete forms in front of the car minimizing the chances that customer would get cold feet during the final moment of the vehicle-buying process. The integration of this technology provides a number of additional benefits to Mercedes-Benz – such as a quick and easy way to show all possible combinations of features to customers and it saves on floor space and printing costs.

**IS Strategy: Business Process Model selection for tablet app development**

To ensure firms consider the key issues associated with app development that will facilitate productivity in the workplace, the first five steps recommended are (figure 1):

1) Understand the tablet device
2) Investigate the 4i’s
3) Comprehend context
4) Consider the 3 C-abilities
5) Undertake vicarious learning

In addition to these steps, to stimulate thinking about how the tablet device might be used for a specific process or application we suggest the decision-making group employ a business process model.

Current processes can be analysed and improved through the use of a business process model. Business analysts and managers who are seeking to improve process efficiency and quality typically perform the business process modelling activity (Williams, 1967). In the approach suggested in figure 1, firms either use existing process models on which to base their analysis or decisions, or indeed
develop new models of processes. Whatever framework is used, it is advised that the firm should consider all aspects of the organization and its value chain affected by implementation of the tablet device.

For illustration (and as shown in figure 1), in this section we briefly discuss and illustrate two well-known business process models from the literature.

**Hammer and Champy’s The Business System Diamond**

The examination and improvement of processes that exist within and across organizations is known as Business Process Reengineering (BPR) or Business Process Redesign. BPR derives its existence from different disciplines; Davenport (1992) uses the term process innovation and defines BPR as encompassing “…the envisioning of new work strategies, the actual process design activity, and the implementation of the change in all its complex technological, human, and organizational dimensions”. Hammer and Champy (1993) developed a now well-known framework ‘The Business System Diamond” where four major areas can be identified as being subjected to change in BPR – organization, technology, strategy, and people – where a process view is used. The approach is graphically depicted (see Figure 1) by a modification of “Leavitt’s Diamond” (Leavitt, 1965).

In the case of Autodesk and Mercedes-Benz discussed earlier, the decision to adopt a new technology, like the tablet device, changes the nature of work in the firm (jobs, and skills). It can even change how the firm is organized (by diffusing decision-making, making the firm flatter by empowering both customers, managers and front-line staff who now use tablet devices to accomplish tasks they could otherwise not accomplish, or only do so with difficulty using a computer.

Tablet devices have unique capabilities that take advantage of new technologies. The rate at which apps have been developed and disseminated and how they dominate the tablet device is a testimony to the velocity and originality of this technology. As a result, the very way in which people now do things (jobs, norms or mind-sets and behaviours) is different, and how organizations interact with their stakeholders is also very different. The business system diamond looks
at every aspect of a firm to understand the unique opportunities afforded by tablet devices and their users.

**The Customer Service Life Cycle Model**

The Customer Service Life Cycle model of Ives and Learmonth (1984), offers a strong customer perspective of the entire buying process; from making a purchase decision, acquiring the offering, owning it, and finally retiring or disposing the offering. In this structured approach each of these phases is comprised of sub-phases that should be looked at through the customer’s eyes, and the whole process, or parts thereof, can be expedited through the effective design of a tablet application.

The framework used by the firm should also be integrative and interdependent, because adopting a tablet affects many facets simultaneously and reflexively. Additionally, to generate a large number of ideas for tablet applications the team can use a group creativity technique or a process such as brainstorming. Group brainstorming, a technique popularized by Osborn (1963), has been shown to double creative output. However, brainstorming is not without criticism and the team could follow alternative methods (Diehl and Stroebe, 1991; Mullen, Johnson and Salas, 1991; Nijstad, Strobe and Lodewijkx, 2003). Once the application(s) are selected, they can be developed, they can be marketed in the media and on the organization’s website, and distributed through an application store or the organization’s website.

**Moving Forward**

The tablet device is still a relatively new phenomenon, and the market for tablets and applications is growing rapidly. Since mobile apps first appeared 2008, mobile app purchases on Apples App Store have just exceeded 100 billion (statistica, 2015), with business apps being one of the biggest categories. To ensure tablets provide value to a business it is recommended that managers keep abreast of effective and creative uses for tables and apps in business. Managers should continue to conceptualize how tablets might effective and efficiently execute business processes by considering the notions of input (inscription), and
output (information) and the interaction between them (Pitt, Berthon and Robson, 2011).

To improve employee productivity and superior customer service the firm should look to develop apps to be more contextive and contextual (rather than isolative) in their use. Develop a strong baseline for determining when to deploy tablets, smartphones or laptops by continually comparing the 3 C-Abilities of tablets versus other mobile devices (Pitt, Berthon and Robson, 2011). Inevitably there will be constant changes in the technological capability of these devices that may require changes as to how these devices might be used. Finally, managers will need to consider the impact on information systems within organizations when employees and customers can access information systems via mobile devices that may be part of a BYOD program.

The landscape of corporate computing is already changing due to the impact of tablet devices. By developing a deep and rich understanding of context is critical to gaining a competitive advantage. This paper articulates a methodology of how the firms can utilize frameworks to choose when and where to use a tablet device, and how to create and deploy applications that can shorten, shift or reshape business processes that fully leverage a tablets unique ability and create value for the firm and the customer.
References


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