

The UD Phenomenon in Japan: Product Innovation Through Universal Design

Alastair S. Macdonald

School of Design, The Glasgow School of Art,
167 Renfrew Street, Glasgow G3 6RQ, Scotland, UK
a.macdonald@gsa.ac.uk

Abstract. The uptake of Universal Design (UD) by manufacturing industries in Japan has been a recent and extensive phenomenon. The sector has identified the significant market opportunities brought about by the rapidly changing needs and lifestyle aspirations of its ageing society. In this review, the author discusses innovation in products, specifically mobile phones, developed through a UD philosophy, within the context of Japanese manufacturing corporate culture and the wider national goal for a socially integrated environment. Corporate literature and product marketing material are also referenced as a means of revealing the relationship between company and customer. The author asks what value can be obtained from understanding the factors stimulating and supporting this phenomenon and if this UD approach in Japan can be translated outwith its unique corporate and national cultures for further applications elsewhere.

Keywords: Universal Design, Japan, Manufacturing, Product Case Studies, Mobile Phones.

1 Introduction

Challenges and opportunities posed by Japan's 'super-ageing' population demographic appear to have provided the initial catalyst for a strategic and national Universal Design (UD) agenda in a broad range of industries creating technological consumer products (Macdonald, 2006). Evidence suggests that Japan is making progress towards its goal of achieving a socially integrated environment through a concerted shift towards prioritizing users' stances and viewpoints rather than manufacturers, developing cross industry strategies, and making available practical and immediately useful products (Toda, 2005). In the area of IT, Japan has also endeavored to bridge the digital divide through UD (Hirokoshi, 2006). In the highly competitive market place, the UD approach appears not only to offer increasingly attractive products that accommodate a wider range of user capabilities but also to possess values which resonate with those of an increasingly diverse and sophisticated marketplace. This paper discusses some of the factors contributing to the UD phenomenon and how UD philosophy is manifest in recent generations of mobile phone products appearing in the marketplace in Japan. If there was an increased

awareness of and a better understanding of the factors contributing to the phenomenon would this be of interest and value manufacturers and innovators globally?

The author has carried out this review in two parts: 1) factors contributing to the UD phenomenon in the manufacturing sector, and 2) case studies of recent generations of mobile phones developed through UD processes and possessing UD features. The second part is discussed within the context of the first.

1.1 Legislation and Standards

Legislation has positively contributed to accessibility both in the built environment, and in the digital and IT environments. Examples of the former include the Heartful Building Law of 1994 (an act to make buildings usable and accessible to older and disabled people), and the 2000 Transportation Barrier-Free Law. More recently (July 2005), Japan's Ministry of Land, Infrastructure and Transport's (MLIT) introduced the General Principles of Universal Design Policy. With reference to IT, the Universal Design Work group of the Communications and Information network Association of Japan (CIAJ) was created in 1999 with the aim of "making smooth access to telecommunication possible for all users including handicapped persons and senior citizens." The CIAJ is a broad alliance of more than 20 companies in the telecoms sector. In 2001, the Japanese Government developed its e-Japan Strategy through its IT Basic Law (Basic Law of the Formation of an Advanced Information and Telecommunications Network Society) with the strategic intention of becoming the world's most advanced IT nation in 2005. This was set up in parallel with implementing a u-Japan Strategy for 2010 ("u" denoting both "ubiquitous" and "universal"), illustrating the move towards UD in Japanese IT policies. Japanese Industrial Standards (JIS) such as its JIS 8341-1 "Guidelines for older persons and persons with disabilities – information and communications equipment" were used in the process of developing standards across the sector and bridging the "digital divide" (Horikoshi, 2005).

2 Cross-Sector Activity

A large number of companies, now near 150, have played a significant role in the process of driving forward the 'inclusive' agenda. The extent of rich industrial collaboration, or at least a highly competitive approach that raises the quality and level of UD activity across a wide range of companies, was facilitated to a significant degree by the formation in 2003 and subsequent activities of the International Association of Universal Design (IAUD) "to address the universal-related issues of an ageing population and to better integrate disabled people" and "to promote the establishment of the foundations of a society in which more people will feel comfortable to live".

The IAUD came into existence only as recently as 2003, yet the recent and rapid uptake of UD across the manufacturing sector perhaps suggests that there are some deeper-seated factors within Japanese corporate culture, or values within its society as a whole, that have helped successfully mobilise and exploit Japan's distinctive

approach to UD. Undoubtedly the IAUD forum has encouraged and facilitated the many participating companies to embrace the UD agenda, and while there is debate over the extent to which company information is openly shared, the value of and energy within this critical mass must be acknowledged. Although companies are individually competitive, they recognize the mutual advantage in sharing approaches and aspirations, understanding that by cooperation, the game-plan for Japanese products and the number of these appearing on the market that serve the inclusive needs of their society will be at a much higher level than their foreign competitors (Kawahara, 2005).

2.1 UD Business Concept

In the same year the IAUD was formed, 2003, the Nikkei Universal Design Business Forum recognized the need to move forward from a set of uniform 20th century production values with negative associations towards a “new social structure ... wherein individuals have the opportunity to inhabit an environment that reflects their distinctive characteristics and values” (Nikkei Design, 2003). This Forum formulated the UD business concept a means of attaining that aspiration through four key themes: the creation of new business, the supply of products and services, potent corporate brands, and creating an accessible environment.

2.2 Achievements

Resulting from this activity and broadly shared philosophy in the manufacturing and business communities, a number of very clear and apparently successful design approaches and products can be cited, including: private vehicles, such as Toyota’s Raum and Porte; domestic electrical products, such as Panasonic’s tilted-front washing machine; and mobile phones, such as Kyocera’s and Mitsubishi’s UD phones. Products with UD qualities now appear to be evolving as a matter of course – easier to use, and with improved designs facilitating easier access to enabling technologies through more accessible and appropriate interfaces supported by associated services. The embodiment of UD principles in mobile phones is discussed in greater depth in Section 4.

3 Japanese Corporate Culture

Japanese UD models have moved on considerably beyond the starting point of Mace’s ‘seven principles’ approach to UD (The Center for Universal Design, 2000) within a very compressed timescale, embedding evolved and individualised UD principles within corporate business structures.

3.1 Company Philosophy

While the phrase ‘universal design’ has come into usage only comparatively recently in Japanese industry, philanthropy has had much more of a tradition in the sense of ‘corporate social responsibility’, or ‘social participation through mutual understanding’ (Yamamoto, 2005). Companies are at pains to communicate a philanthropic

heritage: phrases pepper corporate websites such as ‘social contribution’ and ‘harmonious society’. The tradition of relatively stable lifetime employment in Japanese corporate culture, the creation and sustained support of a cohort of young and dynamic design managers informed in UD principles and philosophy, the absolute devotion to understanding and satisfying the customer, and the engagement of users through specialized user research tools are amongst factors contributing to this phenomenon. Alongside these, better-known Japanese manufacturing methods should also be acknowledged, typified by Toyota’s relentless approach through ‘kaizen’ – continuous improvement - for their relevance and appropriateness.

3.2 The Customer Is God

‘Okyaku-sama wa kami-sama desu’ – ‘the customer is god’: Japanese corporate culture has a long and deep tradition of working tirelessly to improve products and services from a customer perspective. Recent marketing literature for the sophisticated and discerning Japanese ‘baby boom’ generation, now possessing considerable economic leverage, reflects the demand for choice, quality and lifestyle. Those individuals with modified capabilities resulting from the ageing process are as much a part of this sector as any other. But, this is not only a pre-occupation with older and disabled market segments as, for instance, easy-to-use children’s mobile phones which help anxious parents track their children’s location now receive as much attention as ‘easy’ phones for older people.

3.3 Lifestyle Brand

The shift in customer expectations is reflected in the terminology found in much of the corporate promotional material for UD such as: ‘high amenity lifestyles; prosperity, fun, comfort; enriched lifestyles’ (Matsushita-Panasonic); to ‘live a variety of lifestyles’, to ‘able to be used and shared by all, both simply and easily’ (Toshiba); ‘a convenient and value-added lifestyle for as many people as possible’ (Fujitsu); and ‘peace of mind, pleasure, singularity, soothing, safe, affordable, easy, fun, beautiful, essential and simple’ (Toyota). This is customer-oriented language reflecting the features and values sought by consumers in products and associated services.

4 UD in Mobile Phones

Rapid technological change is exemplified in the paradigm-shift in the design of interfaces and functionality for telephones from traditional landline to mobile technologies: these products very clearly illustrate the issues in design that can lead to exclusion of significant sectors of the population. Where there were once analogue interfaces, with dials or push buttons, these have now been replaced by multi-layered menu-driven interfaces with multi-function buttons. Given the evolving market, Japanese carriers have increasingly sought to provide customers with phones designed using UD principles and strategies for the most overlooked sectors: the very young and the very old. Pattison and Stedmon (2006) provide an account of the changing capabilities in individuals as a result of the ageing process with reference to the senses, motor function and cognition together with the corresponding design

specifications required for mobile phones to meet these conditions and their relationship to UD principles. Tomioka (2004) discusses UD practices with reference to accessibility issues and product specifications for mobile phones. Kawahara (2005) considers UD in terms of the physical function characteristics in the range of senses of older people and these in relation to mobile phone design, revealing the extent of, e.g., eye conditions not being addressed for through current designs.

This section discusses the UD features in a number of recent Japanese mobile phone designs and in associated marketing literature: phones and marketing literature were examined and evaluated by the author in the field in Japan.

4.1 First Generation UD Mobiles: Raku-Raku 111

There had been little evidence of accessible, universally designed mobile phones until NTT DoCoMo introduced the 'Raku-Raku' (this translates as the 'Easy-Easy') phone series developed by Fujitsu from 2001 onwards. Innovations included "simple, user-friendly interfaces designed for easy use even by persons unfamiliar with mobile phones" for those "who cannot manipulate the devices intuitively" and with "various features to assist users with visual disability". It has "features to support visual functions along with audio features, as well as an easily viewable display". Fujitsu describe the process towards achieving UD in these phones (Irie, Matsunaga & Nagano, 2005). Kawahara (2005) evaluated the success of the Raku-Raku 111 phone and the market reaction to the design, "this is a hit seller that has sold over 1,000,000 units with one model, but many older people hesitate from buying one as they dislike its outer image that is obviously for seniors, even though it is easy to use." However, it was still proving to be best sellers over five years after being launched (NTT DoCoMo, 2007). Recent innovations in this category of mobile phone include variable text size (standard now across a whole range of mobiles in Japan), and for the camera on some phones to be used as a 'magnifying' device for reading text, useful for those with, for example, macular degeneration.

4.2 Second Generation UD Mobiles: TU-KA S, A101K and Raku-Raku 2006

The 2004 TU-KA S phone by Kyocera (Fig. 1) was clearly targeted at, and marketed for, the older user. The marketing literature literally and visually spells out the analogy between the TU-KA S mobile phone and more familiar (to these particular customers) larger landline-based phone interfaces. This is a mobile phone that allows one to do only four basic things: turn it on, turn it off, dial a number and accept a call. Not only is its design but also its back-up service is promoted as friendly: "you can talk to the [technical back-up] person who responds kindly and politely". The manufacturers state the phone is so simple to use it does not require a manual, one is not provided, and the sales copy on the packaging makes a virtue of this. Scenarios portrayed in advertising leaflets address anxieties that, for example, a worried daughter might have of not being able to reach her mother by landline phone, or of an older person not being able to find a public phone while traveling. In Nikkei Design (2005), the issue of its lack of a screen or camera and its attractiveness to older users was raised. A valuable insight is provided by Kawahara (2005), who reveals that within the group we might stereotypically label as 'the elderly' there are further

sub-groups, each with its own preferences: “Although it has been received favourably by those over 70 it is not received well by those around or under 60 years old. Psychological and aesthetic factors that cannot be measured by operability or simplicity are thought to have contributed to its poor acceptance by those in the 60’s.”



Fig. 1. Kyocera’s TU-KA S mobile displaying a simplified interface with enlarged buttons and characters

However, despite these criticisms of a design that challenged the not-always appropriate conventions of the current status quo, the TU-KA S appears to have been very successful. It won a Japanese ‘G-mark’ Good Design Award for Universal Design in 2004 and Kyocera’s A101K and NTT DoCoMo’s ‘Raku Raku’ (Fig. 2) developed this time by Mitsubishi, both from 2006, follow broadly a similar type of design to the 2004 TU-KA S. The marketing literature for all three models is exceptionally clear and easy to understand and clearly addresses the needs, anxieties and desires of this sector again through scenarios portraying typical anxieties. The A101K is promoted as a ‘talk-only’ mobile, while the Raku Raku’s literature headline is ‘real easy – what everyone has been waiting for’. All have large and clearly contrasting numbered buttons and simple colour-coding for start-call and end-call function buttons. At the top of the A101K are three buttons dedicated to, e.g., one’s home number, and two other personal phone numbers of one’s choice to facilitate one-button dialing. Neither the TU-KA S nor the A101K has a screen, however the 2006 Raku Raku, reintroduces a small screen allowing, e.g., dialed numbers to be seen as well as total call-time. Every time this phone is docked into its charger, a text

message is sent to a selected relative or friend. The A101K also has a handy little ‘drawer’ that can be slid out and on which one can write phone numbers corresponding to the one-button dialing facility. Other features in this generation of phones are very clear on/off buttons (labeled talking/finish with appropriate colour-coding), and technically appropriate sound quality and volume adjustment for older hearing capabilities.



Fig. 2. NTT DoCoMo’s Raku-Raku mobile by Mitsubishi, 2006, showing the ‘talk’ (blue) and ‘end’ (orange) buttons and small screen. A small internal drawer extends from the bottom end of the mobile on which the customer can write phone numbers.

4.3 Third Generation UD Mobiles: Foma D800iDS

Mitsubishi’s 2007 D800iDS mobile (Fig. 3) is the world’s first with screens on both halves of a ‘clam-shell’ design, one of which (the lower) is a touch-screen, and is visually analogous to the hand-held Nintendo DS gaming machine. This is a relatively sophisticated type of UD phone, possessing more functions than the previous generation, but the touch-screen allows the interface to be customized to suit the user’s preferences and most frequently used functions. This has three operational modes based on UD principles to suit different types of users: a phone function, a mail function and a camera function, each of which is accessed by simple and clear menus and navigation. The touch panel has three different modes of text input: 1) handwritten; 2) 2-touch input relating to Japanese syllabary; and 3) 5-touch standard input. A subtle force-vibration sensation is provided for reassurance to replace the feedback one would normally expect from physical buttons. Although appearing in 2006 as a prototype at various trade shows, this has only recently appeared on the market, and its success has yet to be fully evaluated.



Fig. 3. Mitsubishi's D800iDS twin-screen prototype (as at October 2006) now available on the market. The lower screen is a touch-screen and the interface can be customized to the user's preferences.

4.4 Mobiles for Other Inclusive Needs

The UD philosophy is about 'design for the whole population', and UD is not only for older users or those with disabilities. Other types of users may require or may wish simple-to-use features: the TU-KA S model, for example, might also be appropriate for those less comfortable with advanced technology, or those who need, or indeed, prefer very simple interfaces, but in this case a different marketing strategy would be required. At the other end of the market spectrum, there are mobiles designed for children (as well as for their parents' peace of mind). For example, the 2006 NTT DoCoMo 'Kids-Keitai' (kid's mobile) featured a protection alarm and GPS functions (GPS is a standard in many current phones in Japan). Its 'imadoco' (where now?) feature allows parents to track their children by sending information from the child's handset through the service provider to the parent, to restrict who is called from the mobile, to limit call time, and to provide parents with an automatic email at set times. Some, like DoCoMo's 2006 SA800i have alarms that the child can activate.

5 The Potential for UD in Other Regions: Questions Remaining

The emergence of UD philosophy in the Japanese manufacturing sector represents the conspicuous formalisation of a revised approach to design. This is more inclusive in

how it considers a much broader range of individuals' needs, capabilities, and lifestyle aspirations than that accommodated by the mid-20th century paradigm of product development and design. UD appears to provide some means to respond, using customer-centred design approaches, to a wide range of needs across the whole population, and to distinct challenges – and opportunities – facing society at this particular moment in time.

However, a number of questions remain. If the effective mobilization and sustained implementation of a UD approach is, as appears to be the case in Japan, somewhat dependent on a broad and shared corporate and philosophical response within the industrial sector, alongside a distinct cultural agenda and mindset, where does this leave the future for UD with regard to other cultures where industry may be on a very different scale, much more fragmented, and design is outsourced? Given that the technologies embedded in the Japanese UD product examples discussed above are freely available in other countries which also have ageing populations, why is there such a dearth of designs in these regions that not only meet accessibility standards but which are so radically innovative and appealing, the result of sustained development and rapid evolution through successive iterations by dedicated teams? Can the Japanese UD approach and the lessons learnt be transferred and survive outwith both the distinctive Japanese company structures and the unique Japanese national cultural mindset?

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