

Development of Multifunctional Business Phone by Applying Social Value Design

TANIGUCHI Eiichi, TOKUNAGA Mitsuhiro, SHIBATA Yuichiro, NAGAI Kazuki, SATO Masayoshi, MATSUDA Takashi

Abstract

To meet expected social demand, NEC and NEC Infrontia are in the midst of product development for a business-use multifunctional telephone employing the concept of Social Value Design. This "Social Value Design" is the concept that draws upon Human-Centered Design and Design Thinking to create new innovations while balancing the perspectives of people (User Experience) and society (Social Experience). This paper introduces a specific case in which Social Value Design was achieved during the development of an actual multifunctional business phone.



multifunctional business phone, user experience, social experience, innovation, universal design

1. Introduction

NEC and NEC Infrontia plan, develop, manufacture, sell and offer maintenance for multifunctional business phones as part of our corporate network business. The multifunctional business phone is a familiar communication apparatus that efficiently supports work at the office. Due to its nature, in addition to improving efficiency that is important to business, there is an equality about it that enables anyone to use it, as well as emphasis being placed on social value design (SVD) such as innovations to enable integrated use with smart devices. Keeping these facts in mind, we would like to introduce our development of a new multifunctional business phone.

2. Background

In the development of the multifunctional business phone, we recognized that the demand for high accessibility and Universal Design (UD) is growing along with changes in society (such as the progression of global aging), in addition to the requirements of a global product.

Although multifunctional business phones have been used primarily by corporate employees, an increasing number of

companies are adopting the 65-year-old retirement system subsequent to the amended version of the Act Concerning Stabilization of Employment of Older Persons coming into force as of April 1, 2013, so it is expected that the user age range (including elderly) will become broader. What's more, it has been widely adopted for use in hotel rooms both in Japan and abroad, making it a device used by the general public.

Our multifunctional business phones are highly regarded by companies by virtue of the ease of use and connection stability that users demand of a fixed line multifunctional phone, and still enjoy growth in demand. However, fixed line phones in general such as public phones and home phones have steadily decreased since 1997 due to the rapid increase in wireless terminals (such as smartphones).

In order to continue providing telephones with the benefits of "ease of use and stability" to vast amounts of people on an ongoing basis, it will be necessary to accommodate society's needs which are in a state of continuous change.

In such an environment, verifying the needs of a multifunctional business phone based on a well-balanced perspective encompassing both the user experience (UX) and social experience (SX) will bring to light the new problems that need to be addressed. Furthermore, devising breakthroughs to solve

these problems will lead to innovations, and onward to the creation of new values.

3. Product Development Based on SVD Concept

How SVD is incorporated into the development stage of a multifunctional business phone is extremely important. Product development took place based on Human Centered Design (HCD) and Design Thinking, and was validated through the perspectives of both UX and SX.

(1) User Experience perspective

In order to create a multifunctional business phone that can be used comfortably by a wide variety of users from a UX perspective, we conducted Universal Design standardization activities from 2002. First we had a multifunctional business phone evaluated by a wide spectrum of users, and based on this, drew up the UD guidelines of NEC Infrontia, after which version updates have been applied. These UD guidelines were applied not only to the development of the multifunctional business phone but to all of our company's products.

(2) Social Experience perspective

We develop multifunctional business phones that play their part in helping society and organizations run efficiently and smoothly, as well as addressing global environmental and energy issues, by incorporating ideas to reduce power consumption and lessen the need to replace products due to changes in the usage conditions. Furthermore, we are undertaking the globalization of our products by incorporating HCD methodology.

(3) Bolstering product strengths through innovations

We are striving to provide ongoing product enhancements, increased added-value, and improved customer satisfaction, through breakthrough innovations that will allow us to accommodate the latest telecommunications technologies and environments, meet new market needs, and expand our services with devices that can be integrated each other.

4. Examples of Product Adaptation

The specific manifestations of SVD on the DT Series (**Photo 1**) multifunctional business phone are discussed herewith.

4.1 Specific Examples of UX

(1) Accommodating the shape

1) Cursor keys

As shown in **Fig. 1**, conventional units used a single donut-shaped key for cursor movement, however with the new unit four individual buttons were adopted for up/down/left/right operation. While maintaining a



Photo 1 Multi-functional business phone DT Series.

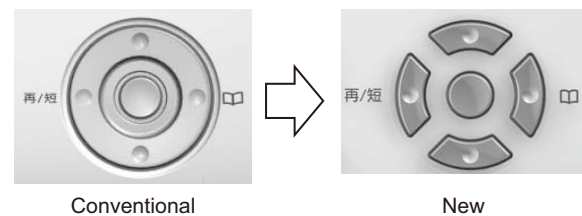


Fig. 1 Cursor key.



Photo 2 Dial buttons.

singular-looking design, the use of separate buttons is friendlier to people with upper limb disabilities who use a stick for button pushing, as it minimizes the likelihood of incorrect operations due to slipping.

2) Dial buttons

Special manufacturing technology was applied for the Dial buttons (**Photo 2**) to achieve transparent keys for sense of luxury while also providing ease of viewing, and the key characters are strong against wear even after extended use. Additionally, backlighting was made

available for easy usage in the dark.

(2) Accommodating a wide variety of users

1) In consideration for the people with hearing impaired

For the people with hearing impaired, considerations were applied to the following two.

- For compatibility with hearing aids, the adopted handset is easy to hear even for users of telecoil hearing aids.
- Wideband sound quality delivers “easy for anyone to hear” sound with clarity and depth.

2) In consideration for the people with visually impaired

For the people with visually impaired, we adopted a voice confirmation function. Instead of a confirmation beeps, when dial buttons 1 and 2 are pressed, a confirmation voice reads out “one, two.” As a result, the totally blind and the visually challenged can aurally confirm which buttons are being pressed.

(3) Accommodating display, brightness and alarm light

For the display screen, we adopted a color LCD with easy-to-read outline fonts in consideration of text color and contrast.

The line buttons (**Photo 3**) illuminate over the entire surface, providing superior distinguishability compared to conventional units. Buttons shine in red and green, and by shining steadily or flashing, clearly convey the different states of each button to minimize misunderstandings.

4.2 Specific Examples of SX

(1) Global compatibility

In order to be able to respond flexibly to the global business scene, the system of the LCD display screen supports characters of 6 to 18 languages. **Fig. 2** shows an example of Russian and Korean. It is capable of meeting the demands of global business.

(2) Expandability

Since each individual phone offers expandability of function buttons via expansion adapter, they are able to flexibly support phone system revisions and additions in case

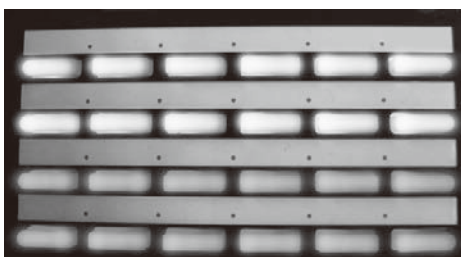


Photo 3 Line buttons.(Differs from actual lighting array)

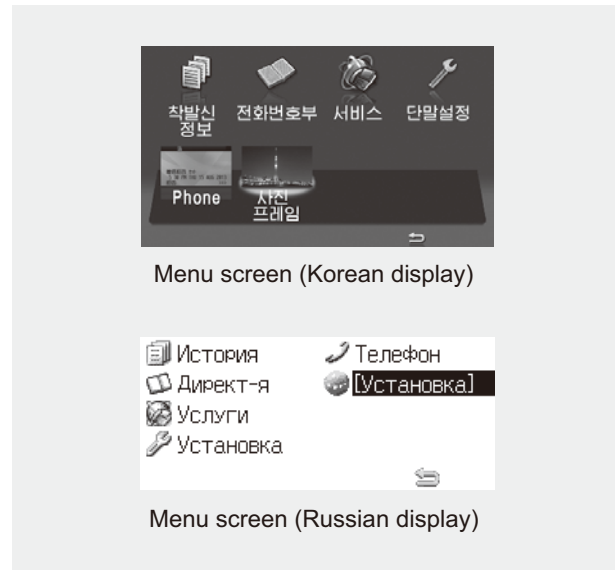


Fig. 2 LCD display examples for Korean and Russian.



Fig. 3 Button add-on adapter.

of any office layout change. By avoiding the unnecessary disposal of phones, it is friendly to the environment. As shown in **Fig. 3**, two types of button expansion adapters are available - 8 button and 16 button.

(3) Power-saving measures

In response to the social needs of saving power, the power-saving function can be engaged automatically or manually when the multifunctional business phone is not in use. It is possible to reduce standby power to zero, helping to reduce power consumption. The system configuration provides a reduction in power consumption of about 30% to 50% (**Fig. 4**).

(4) Power outage countermeasures

As shown in **Fig. 5**, equipping an optional battery on the system side enabled up to 3 hours normal operation even during power outages, thereby supporting social needs as an infrastructure that can be used at any time.

4.3 Specific Examples of Innovations

Because of the spread of smartphones in recent years, we have attempted to develop innovations that integrate smartphones with multifunctional business phones, and will intro-

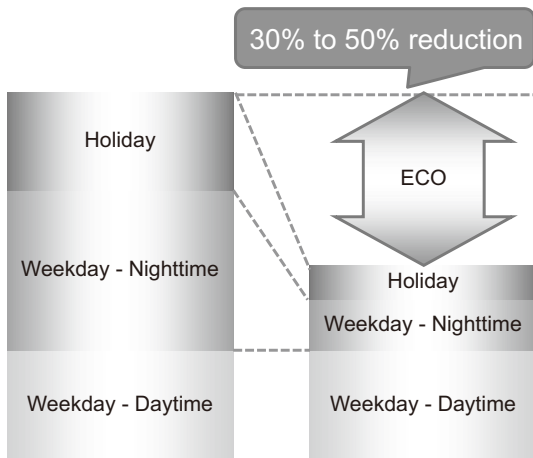


Fig. 4 Reduced power consumption due to power save function.

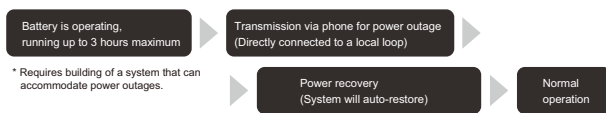


Fig. 5 Power outage countermeasures.

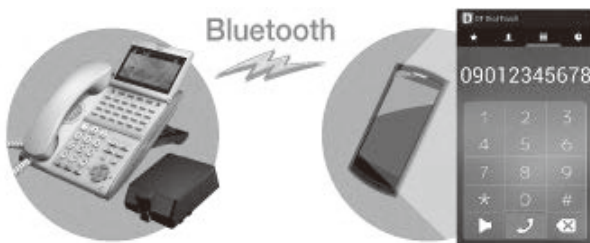


Fig. 6 Integration with smartphone.

duce a new style of operations herewith.

As shown in **Fig. 6**, calls made to a smartphone can be answered using a multifunctional business phone. What's more, it is possible to switch a conversation taking place at a multifunctional business phone over to the smartphone. And in addition, it is possible to use the smartphone's phonebook and call history to make calls from the multifunctional business phone.

Usability is greatly improved by the ability to switch between smartphone and multifunctional business phone according to the situation at hand.

5. Outcome

Our multifunctional business phones are highly evaluated in the market, ranking No. 1 in Japanese domestic market share,

and No. 3 for overseas (as of 2012). Furthermore, developing products with due regard to globalization has enabled marketing on a worldwide scale, with sales handled in 118 countries.

6. Corporate Policy Aimed at SX (Social Experience)

NEC has published details pertaining to accessibility of business phones and related equipment on the Web (see related URL). The opened format to the public is in accordance with VPAT (Voluntary Product Accessibility Template) which is compliant to the Rehabilitation Act, Section 508 in the United States.

VPAT was put together by a council in the U.S. in accordance with the spirit of Section 508 which seeks to promote competition and evolution without specifying any base line for the achievement of accessibility, making it essentially a template for a self-evaluated "report card." VPAT was originally intended for use by procurement officers in the U.S. federal government to use in their market research, and provision of information takes place according to company policy such as (1) full disclosure through VPATs downloadable from the corporate website, and (2) limited disclosure through the release of information in response to individual inquiries by procurement officers. As for our business phones and related equipment, VPATs are published on our website that is viewable by anyone (full disclosure), and by continuously updating for each new additional model, assures accessibility to information not only in the U.S. but by people all over the world.

7. Conclusion

In the future, we intend to continue developing efficient and easy-to-use multifunctional business phones by promoting innovations based on the Social Value Design concept and balancing the perspectives of people and society.

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Authors' Profiles

TANIGUCHI Eiichi

Group Manager
NEC Infrontia, Ltd.

TOKUNAGA Mitsuhiro

Manager
NEC Infrontia, Ltd.

SHIBATA Yuichiro

Assistant Manager
NEC Infrontia, Ltd.

NAGAI Kazuki

NEC Infrontia, Ltd.

SATO Masayoshi

Assistant Manager
Enterprise Networks Division

MATSUDA Takashi

Assistant Manager
Production Coordination Division
Certified HCD Professional
Assistive Technology Coordinator

* The stated titles and departments of the authors that appear in this paper are as of March, 2014.

The details about this paper can be seen at the following.

Related URL:

Rehabilitation Act of 1973: Section 508
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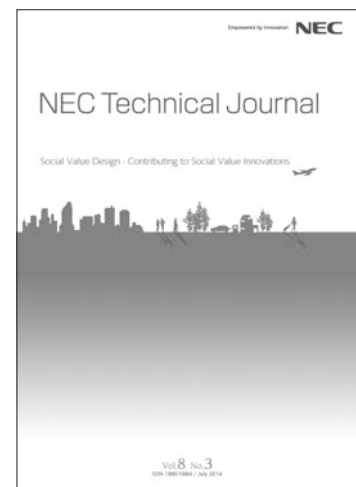
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