Gross Social Feel-good Index—Social Impact Assessment for ICT Services

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Abstract

We have developed a sustainability index that indicates the improvement in social sustainability related to information and communications technology (ICT) services. It is called the Gross Social Feel-good (GSF) Index. With the GSF index, we can quantitatively assess the social impact of ICT services taking into account both positive and negative effects. Such assessments will help us to introduce ICT services effectively and create a sustainable society.

1. Introduction

One of NTT's missions is to create a sustainable society by introducing information and communications technology (ICT) services. ICT services have both positive and negative effects on the environmental, social, and economic aspects of our lives, which are known collectively as the triple bottom line[*1].

On the positive side, they can reduce environmental burdens by promoting dematerialization (the conversion of physical products to digital information), reducing the need for people to use transportation, and increasing efficiency. In addition, they help us perform various types of activity perfectly and eliminate various kinds of adverse conditions from our lives. These positive social effects will also help to reduce social costs such as disposal costs. In terms of negative effects, ICT services may cause environmental burdens to increase as a result of the use of additional electrical equipment. New social issues, such as information leaks and the digital divide, and economic issues, such as the cost increases incurred when the services are introduced, are other examples of the negative effects of ICT services.

If the negative effects exceed the positive effects when a particular ICT service is introduced, that service will not contribute to the realization of a sustainable society; on the contrary, it would be counterproductive. Therefore, we have to assess ICT services quantitatively taking into account their positive and negative effects in order to introduce them effectively and create a sustainable society. However, although the social effects of ICT services have been discussed qualitatively, they have not been assessed quantitatively.

In this article, we describe a new sustainability index that we have developed to assess the improvement in social sustainability achieved by introducing ICT services. There are some indexes for assessing social sustainability at the national level, for example HSM (human satisfaction measure)[*2], but a service-level index is new.

2. Sustainable society

To enable us to propose a new sustainability index for evaluating the contribution of ICT services to the realization of a sustainable society, we first defined

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*1 The triple bottom line is a policy for improving all aspects of the environment, society, and economy from the viewpoint of sustainability. The phrase was coined by John Elkington of SustainAbility (UK) in 1994.

*2 HSM is one of the indexes that indicate social sustainability at the national level. It was developed by Professor Terue Ohashi of Reitaku University.

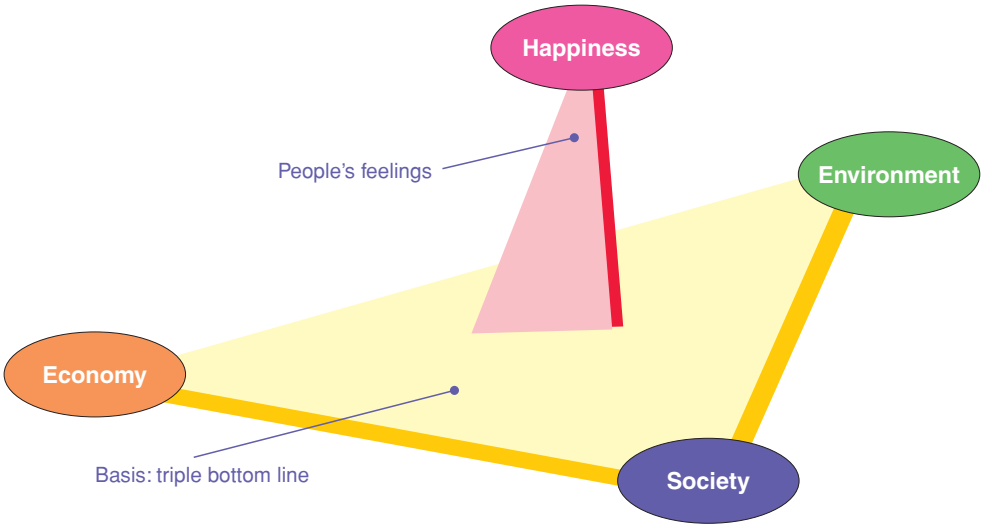

Fig. 1. Sustainable society.

an ideal sustainable society. To be sustainable, a society must satisfy the requirements of the triple bottom line. However, that alone is not sufficient: the feelings of people living in the society are also important. Even if the triple bottom line requirements are satisfied, the society is not sustainable if people feel unhappy. Therefore, we defined a sustainable society as one that satisfies the triple bottom line requirements and makes people happy (**Fig. 1**).

3. Gross Social Feel-good Index

We developed the new sustainability index in accordance with our definition of a sustainable society. Because the society aspect is rather abstract and broad, we subdivided it into three sub-indexes related to safety, health, and comfort. Therefore, our new index is composed of six sub-indexes, namely environment, safety, health, comfort, economy, and happiness. We called it the Gross Social Feel-good (GSF) Index (**Fig. 2**). Its framework including evaluation items for each sub-index is shown in **Fig. 3**. The sub-indexes are described in detail below.

3.1 Environment index

The environment index shows the reduction in environmental impact resulting from the introduction of ICT services. We estimated the environmental impact of ICT services using LIME (life-cycle impact assessment method based on endpoint modeling [1], [2]), which was developed by the Japanese LCA Project. LIME evaluates the damage to four safeguard subjects caused by eleven impact categories. We selected this method because the results are integrated as a single index expressed as a monetary value.

3.2 Safety index

The safety index shows the degree to which people and/or their belongings are safe. We define people's safety in terms of accidents, disasters, and crime. The safety effects of ICT services are determined as a monetary value by using statistical data, such as the number of accidents and amount of damage. For example, the reduced amount of accidental damage is evaluated as the safety index for an ICT service that leads to fewer accidents. Information security is an important issue because the evaluation target of the GSF index is ICT services. Therefore, we consider the risk of information leaks to be a negative safety effect.

3.3 Health index

The health index shows the degree to which people live healthy lives. There are three steps to maintaining our health, namely health care, prevention of illness, and medical treatment. Health care is a fundamental step towards maintaining health. To avoid illness, it is important to detect any physical disorder as soon as possible. If we become unavoidably ill, then effective and efficient treatment will be needed. In addition to

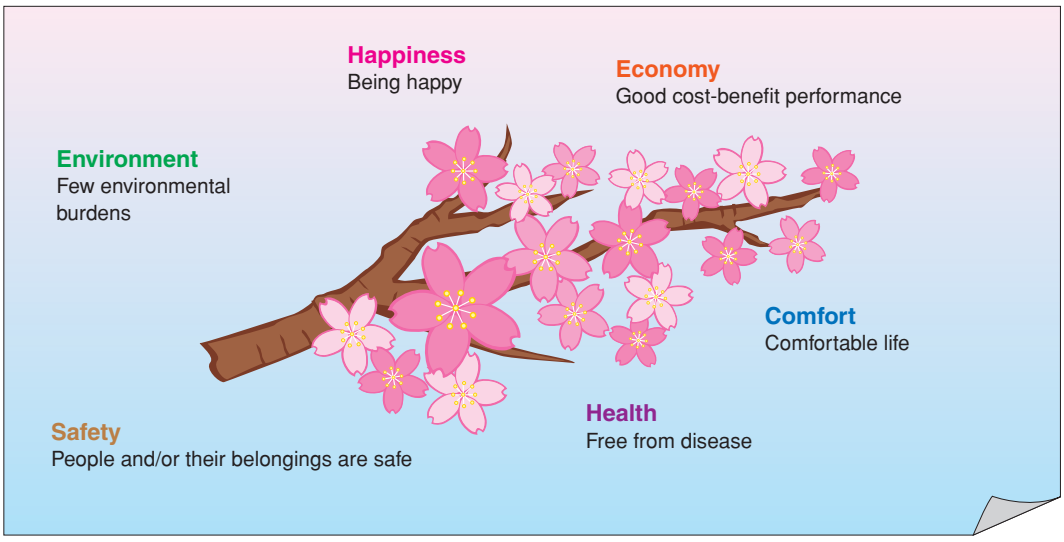

Fig. 2. Gross Social Feel-good Index.

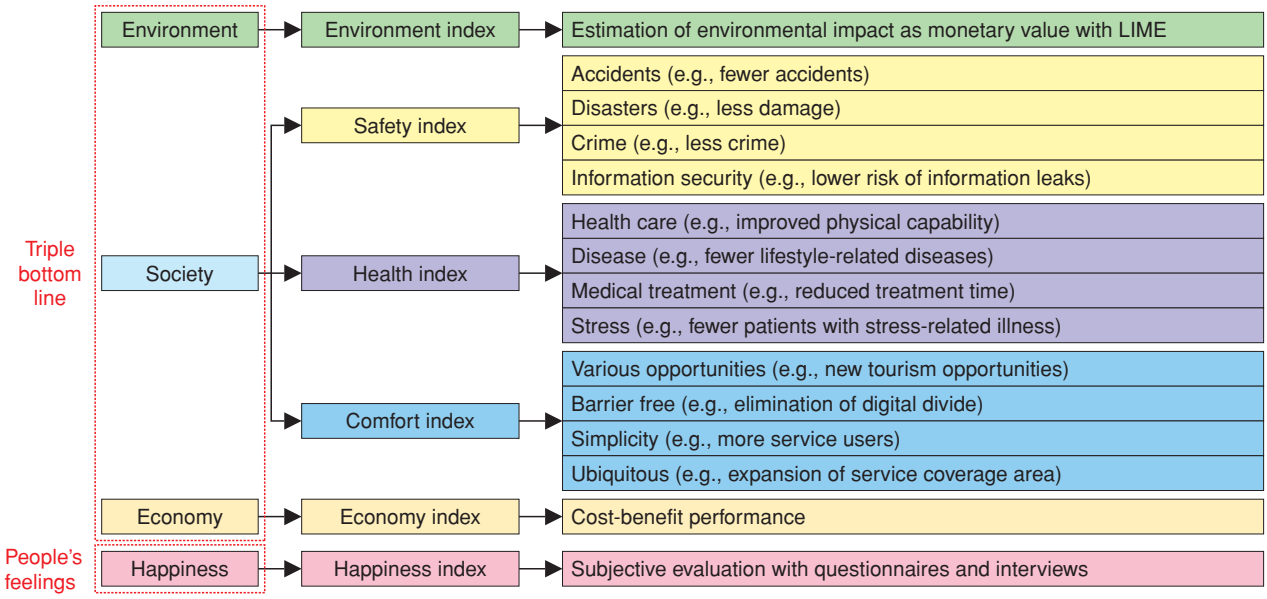

Fig. 3. Framework of GSF index.

physical health, it is also important for us to care for our mental health because stress often causes illness. The health effects are evaluated in monetary terms by using statistical data, for example, the number of sick people and medical expenses.

3.4 Comfort index

Achieving a comfortable life is a fundamental purpose of introducing ICT services. The comfort index shows the degree to which people live comfortable lives. In a sustainable society, people can obtain

information whenever they require it. This obtained information provides various opportunities. For example, we can find somewhere to go sightseeing by accessing information about an attractive tourist spot. ICT services must be simple and easy so that everyone can use them equally, and we should be able to use them anytime and anywhere. The comfort effects are calculated as a monetary value by using statistical data such as mean income, tourism expenses, leisure time, number of tourists, and number of users.

3.5 Economy index

Even if a particular ICT service has a strong positive social influence, the service is not sustainable if its cost is excessive. The economy index indicates the cost-benefit performance of ICT services. The costs of ICT services consist of the initial, running, and disposal costs such as system price, communication expenses, and maintenance costs. The benefit of ICT services is the economic impact brought about by their introduction. We measure them as the life cycle cost and estimate the cost-benefit performance.

3.6 Happiness index

The happiness index indicates people's degree of satisfaction with society. The other five sub-indexes are evaluated objectively using statistical data. However, it is impossible to evaluate people's feelings objectively, so a subjective estimation must be used. Therefore, the happiness index is evaluated through user questionnaires and/or interviews and is estimated as a monetary value by conjoint analysis or the contingent valuation method.

4. Indication of results

Evaluation results are indicated in two ways using a radar chart and a single indicator. An example of using a radar chart to indicate evaluation results for a certain ICT service is shown in **Fig. 4**. The dashed hexagon represents the state of society before the introduction of the ICT service. Points outside it indicate that the ICT service had a positive effect on social sustainability, while points inside indicate that it was counterproductive with respect to social sustainability. In Fig. 4, this particular ICT service improved social sustainability in terms of the environment, safety, and happiness indexes. However, it had no clear effect on the health index and had a negative effect on the comfort and economy indexes. The radar chart allows us to understand which aspects have been improved by ICT services and to identify the areas that still need to be improved.

The single indicator is calculated by integrating the six sub-indexes with a weighting factor for each sub-index. This single indicator makes it easy to compare evaluation results.

Conclusion

With the GSF index, we can quantitatively assess the improvement in social sustainability achieved by introducing ICT services. Such evaluations of ICT services provided by the NTT Group will support our

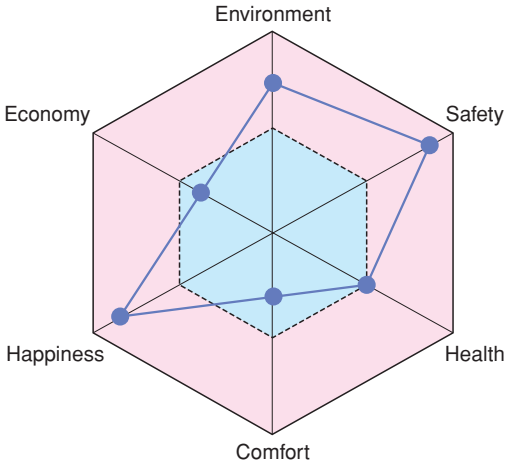

Fig. 4. Indication of results with radar chart.

corporate social responsibility (CSR) management. This index also lets us express the social contributions of our customers who introduce the services. It will enable us to design and introduce ICT services effectively and thus create a sustainable society.

Although the GSF index can be used to evaluate a particular ICT service, it needs more development to enable it to be used for any and all ICT services. Therefore, we will apply it to various ICT services as case studies to confirm its feasibility, create a database for evaluating the positive and negative effects especially with respect to the happiness index, and obtain weighting factors for integrating the six subindexes into a single indicator. These attempts are now underway.

Although the GSF index was designed to assess ICT services introduced in Japan, we would like to extend its concept and use to the whole world as a standardized index for evaluating the sustainability of corporations, autonomous communities, and governments as well as ICT services.

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