The Frontier Service Development Laboratory was established in December 2001 with an aim of creating customer value by developing services. This is the first laboratory in the long history of railways that specializes in development of services.

In order to achieve that goal, we are actively conducting R&D from the standpoint of customers, with an aim of creating new services beyond their expectations. This article will introduce our activities.

“Creation of services” is more difficult that the simple phrase implies. The targets of R&D for such creation depend on how and where the services are provided. In this context, we have been working to create new services beyond customers’ expectations, from both physical and mental perspectives, focusing on stations.

We have three R&D fields as explained below (Fig. 1).

1) Value creation
This field of R&D plays a strategic role of aggressively offering services through marketing. That contributes to the development of future-oriented management policy too. An example is R&D to discover needs that will continue creating new customer value into future, not tied down to current marketing.

2) Amenity creation
This field of R&D plays the role of achieving more secure, more convenient and more comfortable stations and trains, making full use of IT and other state-of-the-art technologies including construction, design, and mechatronics. Actual R&D in progress includes ticketing, providing information to customers, security management and environmentally friendly stations.

3) Space creation
The aim of this field of R&D is to create new spaces to offer services using civil and construction engineering. We are conducting technological development to bring about such spaces to offer reliable and amenity-rich services safely and at low cost while adding high value.

Fig. 1 R&D at the Frontier Service Development Laboratory

The process of creating customer value by marketing involves the following four steps (Fig. 2).

1) Identify and predict current and future customer expectations
2) Develop action plans to meet those customer expectations
3) Implement the developed action plans
4) Check customer assessment of the action plan and provide feedback for 1)

Of the above-mentioned steps, we are responsible for 1) and
4. We call the process of identifying and predicting customer expectation “marketing”.

Marketing results are reported to management for use in making management decisions. At the same time, it is quite important to introduce the results into specific actions of individual business sections. Accordingly, we are carrying out marketing based on continued discussions with individual business sections on the actions and needs that they are considering.

We are currently conducting marketing projects in the following five fields.

1) Marketing projects that target those living and working in the greater Tokyo area

We periodically carry out surveys on movement and consumption by those living and working in the greater Tokyo area. Through those surveys, we make year-on-year comparisons of the lifestyles and preferences of those people to identify and predict changes. The survey results are used as the basic data to make decisions on the implementation of company policies and actions (Fig. 3).

2) Marketing projects contributing to improvement of stations and transport services

We are carrying out marketing projects on rail transport services including stations, timetables and rolling stock. Recently, we have been conducting surveys on customer expectations and needs as well as conditions for image enhancement by line to improve line value.

3) Marketing projects contributing to life-style businesses

We carry out marketing projects on life-style businesses including in-station commerce business and operation of station buildings and hotels. Recently, we have carried out surveys on the assessments of in-station commerce business and hotel brands.

4) Marketing projects contributing to IT and Suica operations

We carry out marketing projects on Suica operations and e-money as well as credit card businesses. We are conducting surveys to identify Suica’s position among PASMO and the many other IC tickets that have emerged.

5) Marketing projects contributing to CS management

We carry out surveys and studies to contribute to improvement of customer satisfaction. An example is the study of an environment where solutions to customer dissatisfaction are developed.

4 R&D for Creating Future Railway Stations

We call a stress-free station that can alleviate many types of stress present in current stations through state-of-the-art technologies a Smart Station. In order to achieve such Smart Stations, we are carrying out R&D in the following fields.

1) Future ticketing

In the greater Tokyo, Sendai and Niigata areas, JR East’s Suica IC ticket system has achieved “Touch-and-Go” service, where passengers can go through the ticket gate simply by touching the gate with a Suica card. In order to broaden the service area to the entire JR East operation area, we are working on development of a lower-cost IC ticket.

We are also proceeding with development to mount e-paper or LCD screens on Suica cards to display the balance amount of e-money and other information in the IC chip. Furthermore, we are studying a ticket gate system that even allows touchless entry using human body communication technology (Fig. 4).

2) Providing information tailored to the individual customer

Information provision, including in and around stations, is currently targeted to the masses. We are now developing guidance systems targeted to the individual passenger, where only required information is provided.

One of those systems is a “Touch Panel Information Terminal” that gives guidance for locations such as stations using a touch panel (Fig. 5). Another system is a Transfer Information Terminal that gives train information to the destination. We will carry our field tests of both systems for practical use during this fiscal year.

Furthermore, we are studying many different on-board information
provision systems. For example, we are developing a system that combines communication services such as TIMS (Train Information Management System) and WiMAX (Worldwide Interoperability for Microwave Access) to automatically notify individual passengers when approaching their destinations.

3) Safe and secure stations
There is always the risk of troubles at stations as they are places where many people come together. So for customers to use stations with peace of mind, we are proceeding with development of a system that automatically detects unusual events in the station or on the platform and informs station staff of those. That will replace current ITV camera information.

We are also developing a system where customers can call station staff in times of trouble and that enables staff to get to the site efficiently (Fig. 6). We will carry out field tests of both systems for practical use during this fiscal year.

One measures to prevent passengers falling from platforms is to equip platform with doors. We are thus developing a type of platform door that is appropriate to situations at JR East stations. Plans are to deploy those on the Yamanote line (Ebisu station and Meguro station) starting next fiscal year.

4) Environmentally friendly stations
JR East is making various efforts to reduce emissions of CO2 that are considered a cause of recent global warming. And our stations are not except from those efforts. We are using renewable energy as much as possible at stations and are making efforts to use energy with lower CO2 emissions and develop energy-saving facilities.

One of those developments is a power-generating floor. In that system, material with piezoelectric elements that are charged by applying pressure is laid on the floor. Those elements generate power when passengers walk on the floor. By improving power generating efficiency, we aim to cover power requirements of automatic ticket gates in the future using this system.

5) Stations with higher spatial functionality
Station structures are often constructed directly over or under the tracks. So, use of station space is often restricted. For example, pillars and supports for the structures have to be located away from the track. Being close to tracks also causes problems in use such as noise and vibration. We are thus developing a construction method where structures can be supported with fewer or slimmer pillars and a method where less noise and vibration are transmitted to the structure. One of those ongoing projects is the development of a construction method where escalator components are used for vibration control.

JR East has constantly performed railway business, life-style business and IT and Suica business based on a customer-first policy since its foundation. This policy is one the pillars of the company that will never change.

At the same time, customer needs are diversifying and technological advances proceeding rapidly. Services that enjoy customer satisfaction today might be outdated tomorrow.

Under those circumstances, the Frontier Service Development Laboratory is determined to proceed with R&D to achieve services ahead of customer needs. Methods to accomplish that include utilizing marketing and various state-of-the-art technologies.