

需求促进城市轨道交通行业技术创新

宋敏华

(中国城市轨道交通协会副会长兼秘书长,教授级高级工程师)



城市轨道交通(以下简称“城轨交通”)是交通创新的重要阵地。我国城轨交通经过 50 多年的发展,尤其是近 20 年来的快速发展,已取得了令人瞩目的成就。巨大的发展规模和质量发展阶段,为创新提供了良好的市场环境。此外,城轨交通涵盖规划设计、工程建设、运营管理、技术装备、资源经营等各领域,产业链长,专业门类多,系统复杂,质量要求高,急需加强技术创新,以持续提高管理水平和质量水平。比如,数字技术在城轨交通的应用,涌现了智能化建设施工管理平台;物联网、移动互联网技术的应用,形成了设备实时感知、在线监测的设备维保新模式;全自动运行系统的研发应用,使城轨交通自动化智能化运营技术迈上新台阶;移动支付的不变革,使 AFC 系统日新月异,节省了大量人力。因此,城轨交通相对其他交通方式更有意愿创新,也更有机会创新。

城轨交通创新已有较好基础。改革开放以来,我国城轨交通行业就十分重视创新工作,大数据、互联网、物联网等现代技术在城轨交通中的应用越来越普遍,催生了城轨交通全新的发展态势。以全自动运行(FAO)技术为例:我国已有 6 个城市 15 条线路(444.4 km)应用了 FAO,有 13 个城市 29 条线路(1 038 km)将应用 FAO;北京市轨道交通燕房线全自动运行系统国家示范工程于 2017 年底开通运营,运营情况很好。我国正紧跟世界发展潮流积极应用 FAO,这已成今后主要发展方向。再看 LTE-M、LTE(长期演进)技术是第 4 代移动通信网络的国际通信标准技术,自中国城市轨道交通协会力推使用该技术综合承载城轨交通通信业务以来,2016 年 12 月,武汉轨道交通 6 号线实现了国内首次 LTE-M 系统承载 CBTC 业务工程化应用。2017 年 11 月,中国城市轨道交通协会对 113 条城轨交通线路进行了统计,有 108 条拟采用或已采用 LTE 承载相关应用,其中 92 条拟采用或已采用 LTE 承载 CBTC。通过 LTE-M 的应用,我国城轨交通正由“跟跑”向“领跑”转型发展。上述这些都为交通创新奠定了基础,也为中国技术引领世界潮流提供了有力支撑。

城轨交通创新一直在路上。我国虽已是城轨交通大国,但是无论是其装备的核心关键技术和品牌知名度以及线网规划的前瞻性和科学性,还是运营管理人的个性化服务理念及自动化智能化新技术应用等,与国际先进水平相比还有差距。因此,持续加强自主创新是行业今后一段时期的主要任务,也是我们每个城轨交通人的责任。

一是牢固树立创新理念。要深入贯彻习近平新时代中国特色社会主义思想,坚持创新、协调、绿色、开放、共享的发展理念。要以需求引导创新,从国家和行业发展的需要和用户需求出发开展创新。要以提高服务水平为创新目的,以促进健康发展为创新方向。要着眼行业、放眼未来,进一步明确创新重点和目标,补齐短板、填补空白,紧跟国际技术发展步伐。要瞄准国际先进水平,布局研发引领性技术和产品,多一些原创技术和创新,攻占国际市场高地。

二是抓好自主技术创新。要鼓励运用自主创新的技术和装备,规划设计建设和装备企业要根植于我国城轨交通的土壤,以满足乘客和运营服务需求为导向,不断突破关键核心技术,不断提高技术服务和产品质量,加强原创技术的研发与突破,力争抢占发展先机。要用好我国城轨交通巨大的市场规模,不断培育本土品牌的发展壮大,力争产生自己的世界知名品牌和企业。

三是不断提高运营服务水平。运营服务是城轨交通的核心环节,也应是城轨交通是否强大的重要标准之一。要加快推进人工智能、互联网、物联网、云计算、大数据等现代技术在城轨交通的应用,向技术创新要安全、要效率、要舒适。要进一步提升服务理念,更加注重为乘客提供人性化、个性化和多样化的出行服务。要在应对大客流挑战中,不断提高我国城轨交通的安全水平、出行效率和服务水准,力争打造领先世界的中国服务标杆和中国服务标准。

毫无疑问,由于赶上了一个民族振兴的好时代,我们这些城轨交通工程师才有了施展空间并取得了举世瞩目的建设成就。让我们持续推进城轨交通的高质量发展,为交通创新和交通强国建设贡献更大力量。

Commentary

Technological Innovation of Urban Rail Industry Promoted by of Urban Rail Transit Demand

SONG Minhua

(Vice-president and Secretary General of China Urban Rail Transit Association, Professor)

Urban rail transit occupies an important position in traffic innovation. With rapid development in the past 50 years, especially in the early past 20 years, urban rail transit in China has made remarkable achievements. The huge development scale and

(Continued on page 174)

(Continued from Commentary)

rapid development provide a good market environment for technological innovation. In addition, urban rail transit contains planning & design, engineering construction, operation management, technical equipment, resource management and other fields, featuring long industrial chain, multi-professional categories, complex system and higher quality requirements. Therefore, it is an urgent need to strengthen the technical innovation for the sustainable improvement of the management and quality level. For example, because of the application of digital technology in urban rail transit, emerged the intelligent construction management platform; because of the application of Internet of things (IoT) and mobile Internet technology, a new mode for device real-time perception and online monitoring in equipment maintenance has been formed. Also, the research and application of automatic operation system has pushed urban rail transit automation intelligent operation technology to a new stage; the constant mobile payment changes have increasingly perfected the AFC system, saving a lot of manpower. In this sense, urban rail transit has more urgent need and opportunities for technical innovation compared with other modes of transportation.

Urban rail transit innovation has a good foundation. Since the reform and opening-up, urban rail transit industry in China has attached great importance to technical innovation. Following the increasingly widespread application of big data, internet, IoT and other modern technologies in urban rail transit, a new development trend of urban rail transit is created. Take the full automatic operation (FAO) technology as an example. In China, FAO has been applied to 15 lines in 6 cities with the total length of 444.4 km, and other 29 lines of 1038 km in 13 cities will also adopt FAO. A national FAO demonstration project—Beijing Rail Transit Yanfang Line—was put into operation at the end of 2017 with good operating conditions. In this filed, China is actively keeping up the world development trend, making FAO the main development direction in the future. Taking another look at LTE-M. Long term evolution (LTE) technology is currently the international communication standard technology for the 4th generation mobile communication network. LTE is an international communication standard technology with core independent intellectual property rights in China. Since China Urban Rail Transit Association promoted the application of the system in the integrated bearer service of urban rail transit production business, in December 2016, Wuhan rail transit Line 6 realized the first engineering application of LTE-M system to carry CBTC business in China. In November 2017, the association counted 113 urban rail transit lines, among which, 108 lines planned or had adopted LTE to carry relevant applications, and 92 lines planned or had adopted LTE to carry CBTC. Through the application of LTE-M, urban rail transit in China is transforming from the following mode to the overtaking mode. All of this have laid the foundation for transportation innovation and provided a strong support for China to lead the technology development in the world.

Urban rail transit innovation has been always on the way. Although China is regarded as one of the major urban rail transit countries, compared with the advanced international level, a big gap still exists in various technical fields, including the core technology and brand awareness, the perspective and scientific nature of line network, the operation and management of human culture, the personalized service concept, the automatic and intelligent application of new technologies. Therefore, in the coming days, the main task of the urban transit industry in China is still independent innovation, realizing which is the responsibility of all urban rail transit industry personnel.

Firstly, the concept of innovation should be firmly established. The thought of socialism with Chinese characteristics for the new era of XI Jinping must be deeply implemented by insisting on the development ideas of innovation, coordination, green, openness and sharing. Innovation should be guided by demands of national and industrial development and users' needs, which aims at the improvement of service level and the promotion of healthy development. It is necessary to focus on the industry and future development, define the key points and aims of innovation, keep up with the pace of international technology development by making up the short board and filling the blanks. It is necessary to aim at the international advanced level, develop the leading technologies and products based on research and development, seize the international market highlands with more original technologies and innovations, and strive to change position from the backward to the advanced.

Secondly, the self-innovating technology should be firmly seized by encouraging the use of independent innovation of technology and equipment, the plan and construction. The equipment enterprises should to be rooted in passenger and service oriented urban rail transit soil of China, constantly break through the key technology, improve the technical service and product quality, strengthen the research, development and breakthroughs of the original technology, strive to take the development opportunities. The market environment of technological innovation should be nurtured and supported consciously, the huge market scale of urban rail transit in China should be fully used to constantly cultivate and develop local brands, aiming to achieve the goal of creating world famous brands and enterprises.

Thirdly, the level of operational services should be constantly improved. Being the critical link in urban rail transit, operation service is also one of the important criteria for the evaluation of urban rail transit. Therefore, the application of artificial intelligence, internet, internet of things, cloud computing and big data in urban rail transit should be accelerated to achieve safety, efficiency and comfort based on technical innovation. More humanized, personalized and diversified travel services should be provided for passengers, and in response to the challenges of large passenger flow, the safety level, travel efficiency and service level of urban rail transit in China should be continuously improved, aiming to build a world-leading Chinese service benchmark and service standard.

As engineers in urban rail transit industry, there is no doubt that we are in a good time of national rejuvenation, with favorable opportunities to fully develop our abilities for the world-renowned achievements ever made in history. We'll continue to promote the high-quality development of urban rail transit and make even greater contribution to the innovation of transportation and the construction of a prosperous country.

(Translated by JIANG Jiacen)