Research on Foreign Quality Infrastructure Services Supporting SMEs
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Abstract. In order to learn the successful experience of quality infrastructure collaborative services in foreign developed countries, this paper carries out a comparative study of several programs including United Kingdom’s Manufacturing Advisory Service, Germany’s Fraunhofer Institutes, Korean Standards Association and Japan’s Kohsetsushi Centers, and finally proposes some suggestions for establishing the cooperative service of quality technology infrastructure in China.

Introduction

Quality infrastructure was jointly proposed by United Nations Conference on Trade and Development and World Trade Organization in 2005, which covers metrology, standards, accreditation, testing, quality management, etc. At present, quality-focused international trade competition is escalating. To a large extent, the competition centering on quality is a competition of national quality infrastructure. If a country does not possess a complete quality infrastructure, it will not be able to upgrade its quality, let alone the promotion of national competitiveness. Therefore, this article aimed at make a deep research in the quality infrastructure services of UK, Germany, Japan and South Korea, hoping to learn advanced experience from these developed countries and improve the quality infrastructure collaborative services of China.

Manufacturing Advisory Service (MAS) of the UK

To provide SMEs in manufacturing industry with technical consultation and strategic services, Department of Trade and Industry, UK established the Manufacturing Advisory Service in April 2002. The center is affiliated to Department for Business, Innovation and Skills, following a multilateral cooperation pattern involving government support, social participation and expert services. It also provides British SMEs with services covering technical information and quality infrastructure. MAS was reorganized in November 2011 and it has become a national manufacturing consulting group that serves SMEs across the UK since January 2012. As a result, its services and functions have also been expanded.

Service Process

The main task of MAS is to support enterprises' actual operations based on their specific business status. It is capable of formulating long-term plans and strategies for manufacturers, helping them improve technical process, exploit new product markets and develop supply chain, offering support and services for such aspects as export, financing, leadership building and management skills. The specific service process is as follows:

Firstly, identifying enterprise's demands. After receiving an enterprise's request for assistance, MAS would first entrust a senior manufacturing expert to conduct a brief business review and diagnosis on the enterprise; establish enterprise’s health archive; clarify the enterprise's hurdles in development; discuss over the opportunities for the enterprise to improve; create an action plan.

Secondly, implementing business strategies. The enterprises can choose technical advisors which they want to cooperate with in order to achieve their objectives. MAS would help the enterprise implement the business strategy in the following aspects: determining the priorities; quantifying and formulating anticipated results and benefits; and managing the enterprise's project to ensure its normal operation.
Thirdly, attaining the enterprise's goal of growth. MAS will help the enterprise improve and develop its business, open up new train of thoughts, improve the enterprise's technical process, foster a new supply chain and determine the enterprise's future capacity.

Content of Services

MAS adopts the optimal solutions to manufacturing practice. In particular, it improves enterprises' quality infrastructure centering on lean manufacturing so as to increase productivity, boost enterprise development and strengthen enterprise competitiveness. Its services cover the following aspects:

(1) Technical support and manufacturing research services. Through hotline and email, experts of MAS can answer a wide range of questions related to technologies.

(2) Production audit. MAS conducts actual assessment, which gives solutions regarding the problems found by production audit and takes actions targeted at the field with remarkable business performance to enhance the performance.

(3) Consulting support. The consulting support and service of MAS focus on four key areas. The first area is innovating thinking and supporting the development of new ideas, which includes all the aspects of manufacturing industry, e.g. formation of product concepts and intellectual property audit. The second is production technique improvement which is achieved by the introduction of the lean manufacturing approach, Six Sigma and comprehensive quality management. The third is business planning. The strategic support of MAS addresses marketing strategy, quality standard, daily management cost analysis, e-commerce strategy, profit, etc. The fourth is supply chain development, whose support covers auditing and optimizing existing supply chain, helping with new supply chain development, etc.

Fraunhofer Institutes, Germany

With Fraunhofer Institutes as the pivot, the cooperative service pattern for quality infrastructure in Germany transforms the basic research of institutions into commercial products and industrial production processes in order to provide small and medium German enterprises with technical support.

Institutional Framework

Fraunhofer Institutes was established in March 1949. It acquired the fund of Marshall Plan from the German Federal Government in 1951 and began to receive contractual research fund from Federal Ministry of Defense in 1956. Since then, it has rapidly developed while keep receiving financial support from the Federal Funds. In the early 1990s, the Society began to expand and establish overseas research institutions. Through ceaseless development, it now runs more than 60 research institutions, and has more than 20,000 employees with annual budget of around 1.8 billion euros. The Society's research institutes in Germany are run by the headquarters in Munich. The executive committee is the supreme administrative body, which appoints the director of each Fraunhofer research institute across the nation. Every research institute is connected with a local German research university and the director is normally an employee of the university.

Content of Services

The core task of the Society is to enable SMEs to apply scientific and technological innovation as early as possible. Generally, SMEs have insufficient or even no internal research capability and have to be supported by external resources. The Fraunhofer institutes accept contractual research activity, and establish technical research institutions to develop new technologies, new products and new processes for SMEs and help them solve organizing and managing problems in their innovation and development.
Korean Standards Association (KSA)

KSA was formerly known as Analysis and Testing Laboratory of the Mint Office which was established in 1883. As the result of economic development of South Korea from the 1990s onward, the number of SMEs has increased remarkably. To enhance the management and the services for SMEs, South Korea established the Small and Medium Business Administration in 1995 and designated its subordinate organization Korea Institute of Science and Technology to be responsible for improving the standards for SMEs and the quality of industrial products. With a reform in duties and service scope, it was renamed Korean Standards Association. KSA provides SMEs with relevant services in industrial standardization, quality management and certification, testing and assessment and other aspects of quality infrastructure.

Institutional Framework

Subordinate to KSA are departments including Division of Industrial Technology Research and Development, Standard and Measurement Division, Quality and Safety Division. The Division of Industrial Technology Research and Development consists of Chemical Department, Mechanical and Electric Department, Advanced Technology Department and Ceramic Technology Research Institution. The Standard and Measurement Division is composed of International Cooperation and Measurement Office, Textile and Chemical Standard Office, Machinery and Metal Standard Office, Electronic and Information Technology Standard Office as well as Construction Material and Later-period Standard Office. The Quality and Safety Division consists of Quality Management Office, Quality System and Laboratory Accreditation Office, General Commodity Safety Office and Machinery Safety Office.

Content of Services

The services of KSA cover every aspect of quality infrastructure and could be summarized as follows: KSA is responsible for formulation and amendment of standards, and participants in international standardization organizations, regional organizations and so on; it is authorized to manage the South Korean statutory measurement system, designate calibration laboratories, and enacting technical standards for calibration; and it performs certification and laboratory accreditation, and implements the quality infrastructure education plan. KSA provides SMEs with the following quality infrastructure services:

(1) "Family Doctor" Program. KSA technically supports SMEs by supplying more than 200 research programs and more than 4,000 pieces of research equipment. Each researcher keeps in contact with 1 or 2 potential companies and provides the "family doctor"-type technical services.

(2) Establishing pilot factories. By establishing pilot factories (involving surface preparation, rubber, heat treatment, etc.), KSA commercializes laboratory technologies, experiments and tests.

(3) Promoting strategic projects. By analyzing technologies, KSA selects projects with strategic significance and supports their development, including research on prototype producing, mass production, post-production assessment, etc.

Kohsetsushi Centers, Japan

In Japan, the provision of quality infrastructure cooperative services relies on Kohsetsushi Centers. Kohsetsushi Centers are managed by local prefectures under the guidance of Ministry of Economy, Trade and Industry. They provide small and medium Japanese enterprises with a series of quality infrastructure services, which include inspection and testing, analysis and instrument facilities, industrial technical guidance, technical assistance and training and open laboratory and testbed. As the bridge between SMEs and public testing facilities, Kohsetsushi Centers play an important role in supporting the technical improvement of SMEs, improving quality and refining production.
Institutional Framework

Kohsetsushi Centers were established in Japan in 1902 with the purpose of supporting small and medium Japanese enterprises. Such centers were founded by university research institutes at first, and then by local governments after the Second World War. Kohsetsushi Centers are administered under the guidance of Ministry of Economy, Trade and Industry, but are managed locally by prefectures. Each of the 47 prefectures in Japan has at least one center.

Currently, Japan has 182 Kohsetsushi Centers, with 6,900 employees, 5,300 of which are engineers. Serving as the bridge of SMEs, the centers have been proved to be effective in quality infrastructure including inspection and testing.

Content of Services

The services of Kohsetsushi Centers contain the following aspects:

1. The centers serve SMEs in product testing and detection, verifying the conformity of products through product analysis, and provide services relevant to calibrating and measuring instrument and equipment to help enterprises improve product quality and precision.

2. The centers help SMEs solve technical difficulties and apply new technologies through technical support. Each center would provide SMEs with consulting services. For a simple problem, it gives solutions via telephone or network; for a complicated one, it will send personnel to the company to carry out a field survey and conclude a final solution accordingly.

3. The centers cooperate with employees of SMEs and help them do research and develop new technologies and products. Personnel of the centers would dedicate up to half of their time to research, focus on research application projects and stay in frequent direct contact with local manufacturers. Generally, each SMEs would send one or two employees to a Kohsetsushi Center to work on a relevant project for the purpose of giving the employee a training opportunity and transferring information and technologies to the company.

Conclusion

Nowadays, more and more countries have realized the importance of improving productivity and competitiveness by adopting advanced quality management and serving SMEs with quality infrastructure. MAS improves enterprises' quality infrastructure particularly by lean manufacturing, which will further raise technological level; KSA provides SMEs with services of metrology, standards, accreditation, testing, quality management, etc.; Kohsetsushi Centers provide SMEs with massive services in testing, inspection and other aspects. The foregoing quality infrastructure collaborative services of UK, Germany, South Korea and Japan all indicate that countries with different quality infrastructure system play an extremely important role in promoting enterprises' technical innovation, increasing product competitiveness and boosting domestic economic and social development.

The successful experience in collaborative services of quality infrastructure set a good example for China in its establishment and improvement of quality infrastructure collaborative services: firstly, cooperative quality infrastructure services can be elevated to the national strategic level, and national policy measures can be introduced to guide the implementation of the services; secondly, a special fund mainly invested by government should be set to promote the development of the services through solid fund guarantee so as to stimulate the input of social fund and enhance enterprises' competitive edge; thirdly, it is strong recommended to strengthen the training of quality infrastructure professionals, explore a path to cooperate with organizations like universities and research institutions and build a team that extensively involves experts.

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References


