

Summer 5-27-2016

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## Recommended Citation

Fu, Qiang and Li, Jing, "Case Studies Conducted in China Based on ISO Economic Benefits Assessment Methodology of Standards" (2016). *WHICEB 2016 Proceedings*. 42.  
<http://aisel.aisnet.org/whiceb2016/42>

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## **Case Studies Conducted in China Based on ISO Economic Benefits Assessment Methodology of Standards**

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**Abstract:** ISO developed, with the support of Roland Berger Strategy Consultants, a methodology for the assessment and quantification of the economic benefits of standards with the objective to quantify the impacts of standards on organizations and to allow the comparison between the assessment results of different organizations. This paper systematically reviews the basic Conditions of the ISO research project of standard economic benefits, gives introduction of the ISO assessment methodology and the brief introduction to the case studies of the application of ISO assessment methodology in China. In addition, this paper gets some preliminary conclusions of the ISO research project of standard economic benefits, and gives some ideas of how to improve the ISO assessment methodology based on China's national conditions.

Key words: ISO; Standards; Economic Benefits; Assessment Methodology; Case Studies

### **1. INTRODUCTION**

Standards played an important role in enterprises, industry and country at different levels. Economic benefits which standards yielded have become the focus of attention, but there have been no evaluation methods and detailed statistical conclusions that are generally agreed on. In the past decade, in developed nations, including Germany, the UK, Australia, France and Japan, there have been studies to various extents on the methodology to evaluate the economic benefits of standards. They assess the relationship between the early input and subsequent output of standardized activities and meanwhile they take the evaluation outcome of the economic benefits from standards as the important reference for the state to set up standardized strategies and policies.

### **2. BASIC CONDITIONS OF THE ISO RESEARCH PROJECT OF STANDARD ECONOMIC BENEFITS**

Supported by the German strategic consulting firm Roland Berger, the ISO designed a method based on the concept of value chain to assess and quantify the economic benefits from standards to corporations. From October 2010 to May 2012, together with its more than 20 member states, the ISO had developed the pilot projects of 21 cases. These pilot projects had been jointly developed by the ISO, corporations subject to evaluation, and local universities or research institutions. The staff of the general secretariat of the ISO served as the consultant of the project teams. The first volume of the cases was published in August 2011 and the second volume was published in August 2012.

The corporations in the 21 cases that had been completed are of different sizes from small firms that have 25 employees and 4.5 million USD annual sales to big firms with a few thousand employees and over 1.5 billion USD annual revenues. The relevant information of the corporations of the pilot projects is contained in Table 1.

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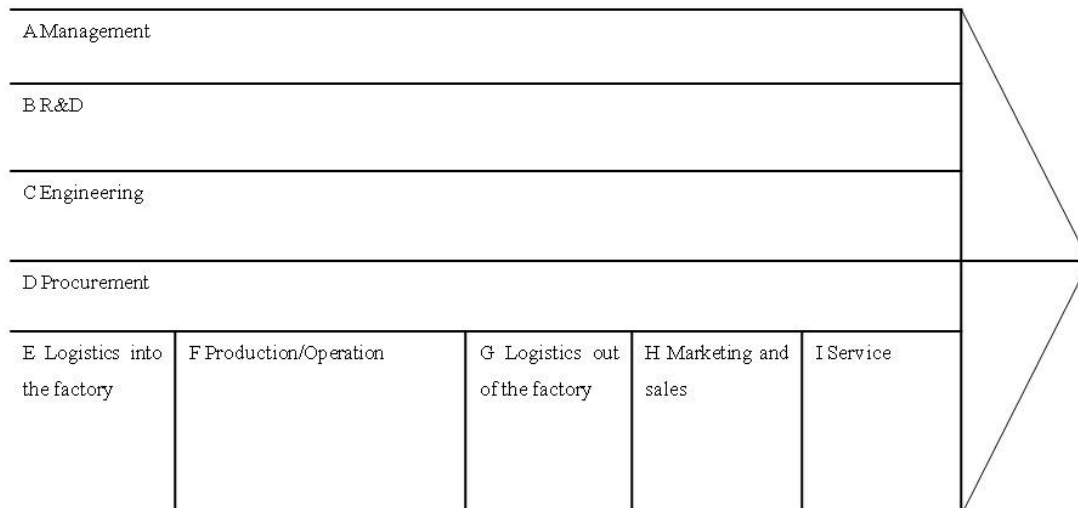
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**Table 1. Statistics of the case studies of the ISO standard economic benefits**

Industry	Country
Trade in agricultural produces	Peru
Chemical industry	Thailand
Architecture and construction materials	Botswana Indonesia Lebanon South Africa Sri Lanka
Electrical appliance	Vietnam
Electricity transmission	Germany
Electronics	Italy
Food retail /Food logistics	Cameron Singapore
Heating equipments, ventilation equipments, and air conditioner	Jordan
Industrial automation equipments	Brazil
Information and telecommunication	Germany
Juice products	Egypt
Pipe and pipe system	China Colombia Mauritius
Shipbuilding	China
Water supply system	Senegal

### 3. INTRODUCTION TO THE ISO ASSESSMENT METHODOLOGY

In 1985, Professor Michael Porter from Harvard Business School proposed the concept of “value chain”. According to Porter, “Every corporation is a conglomerate of various activities in the process of designing, producing, selling, distributing, and assisting its products and all these activities can be reflected in a value chain.” The creation of value by corporations consists of a series of activities, which can be divided into two categories: basic activities and supplementary activities. Basic activities include internal logistics, production, external logistics, marketing and sales, and services. Supplementary activities include procurement, technological development, human resources management, and corporate infrastructure. These activities of production and management are different but interrelated with each other, constituting a dynamic process of value creation, namely the value chain, which is ubiquitous in economic activities. Industrial value chain exists between the associated upstream and downstream firms. The associations between the business units inside a corporation constitute the corporation’s value chain. And value chain connections exist between the business units inside a corporation. Each value activity in the value chain affects how much value the corporation can ultimately achieve. The model of value chain is shown in Figure 1.



**Figure 1. Model of value chain**

Based on the concept of “value chain”, the ISO adopts the method of comparative analysis to assess in four steps the economic benefits of standards. Firstly, it determines the industrial value chain. It puts the corporation under study into the background of industrial value chain and determines the business functions most relevant to the corporation. Secondly, it determines the impacts of standards to the corporation’s major business functions and relevant activities and selects indicators to determine such impacts. Thirdly, it determines the value-driving factors and key performance indicators. Value-driving is the major corporate capacity that enables a corporation to have competitive advantages. By determining the corporation’s value-driving factors, the focus of the assessment will be put on the impacts of the standards that are most relevant to the corporation. Then we deduce every value-driving indicator (namely key performance indicators, abbreviated as KPIs). Thus we transform the benefits of the standards into two forms: decrease in costs or increase in revenues. Fourthly, we assess the economic benefits of standards. We quantify the impacts of the standards that are most relevant to the corporation and calculate the impact of each standard on interests and EBIT. Finally we sum up the economic benefits of standards at the corporate level.

**4. BRIEF INTRODUCTION TO THE CASE STUDIES OF THE APPLICATION OF ISO ASSESSMENT METHODOLOGY IN CHINA**

In China, Xinxing Ductile Iron Pipes Co., Ltd. (hereinafter abbreviated as “Xinxing”) and Dalian Shipbuilding Industry Co., Ltd. (hereinafter abbreviated as “Dalian Shipbuilding”) were chosen for case study. Both corporations have a few thousand employees and perfect market. The two case studies show that standards are widely used as the basis for the corporations’ operation. Xinxing is located in Wuan city, Hebei province. Its main products include centrifugal casting iron pipes and pipe fittings, hot rolled ribbed steel bars, hot rolled plain bars, steel bar gratings, double (multiple) seamless steel tubes and special seamless steel tubes, and steel-plastic composite pipes. The cast pipes are mainly used in the water supply and drainage system and natural gas shipment in urban infrastructure construction. Dalian Shipbuilding is a modern corporation covering five major industries of shipbuilding, military industry, ocean engineering, ship repairing (breaking), and heavy industry. In the field of shipbuilding, its products are oil tankers, bulk freighters, container ships and special ships.

It is noteworthy that these two cases have very much different scopes of assessment. The study on Xinxing covers the use and impacts of standards in all business fields of corporation operation, while the research on Dalian Shipbuilding focuses on only one key area, namely R&D. Obviously, the research results depend on the scope of the business activities that are subject to study. The total impact on Xinxing is about 0.67% of the corporation's annual revenues. The result of the research on Dalian Shipbuilding is confined to the impact of standards on R&D and therefore cannot reflect the total revenues brought by the use of standards to the corporation. However, shipbuilding is a R&D intensive industry and unique products of small production volumes are launched frequently. The impact of standards on the annual revenues of the R&D business is about 12.19%. Such assessment confirms that standards have indispensable important impact on the design in the shipbuilding industry.

## **5. PRELIMINARY CONCLUSIONS OF THE ISO RESEARCH PROJECT OF STANDARD ECONOMIC BENEFITS**

The results of the case studies that have been completed by the ISO show that corporations have gained economic benefits from using standards. In the pilot projects, the standards mainly have two kinds of impacts. Firstly, standards can be used to simplify corporation's internal procedure, improve efficiency, and reduce the transaction costs with the suppliers and clients. Most case studies have proved that such impacts generated by the use of standards account for 0.5% to 5% of the corporation's annual revenues. Secondly, some case studies also show that standards are used as the foundation for developing new products and exploring new markets. In these circumstances, the impacts of standards account for 9% to 33% of the corporation's annual revenues, as standards enable corporations to be the market leader at least for a certain period of time. By using key standards, a corporation might form or enter a new market. In such circumstances, standards often play a key role and make sure that potential customers will have confidence in new technology or believe that the corporation just entering the new market is able to consistently provide products and services that meet their demand. The pilot projects also proved that valuing standards can help a corporation to enter a phase of higher value added in the industry's value chain.

## **6. THE IDEA OF IMPROVING THE ISO ASSESSMENT METHODOLOGY BASED ON CHINA'S NATIONAL CONDITIONS**

We apply the ISO methodology to assess the economic benefits of standards, compare the results of case studies with the case studies that have been completed in the world, analyze the economic benefits of standards in different economic and social environments in different countries, study the channels and methods to improve the economic benefits of standards, and provide suggestions for the setup of relevant policies. The successful application of the assessment methodology in China helps the stakeholders to better understand the economic benefits of standards and improves the understanding of corporate managers and technical staff towards the importance of standards. However, the assessment methodology itself still needs improvement.

The concept of value chain is the framework of the ISO assessment of the economic benefits of standards. The greatest challenge in the application of the methodology is to separate the impacts of the standards from the impacts of other factors. Therefore, we must familiarize ourselves with the production and business activities in

the scope of research. In order to obtain the original data for assessment from multiple angles, we shall connect the data obtained from the individual interviews with relevant managers of corporations and the information obtained from the industry or similar corporations. We shall compare and analyze these two kinds of information. Since China adopts the management system that combines mandatory standards and recommended standards, when considering the impacts of mandatory standards, we shall consider only the economic benefits of the mandatory standards on the corporation's production and business activities and ignore the mandatory characteristics. The scope of assessment of this methodology does not taken the corporation's internal standards into account. However, the internal control standards set up by corporations that have higher technical standards than external standards (international, national or industrial standards) shall be included into the scope of assessment. The methodology of assessment of the economic benefits from standards to corporations must refine the relevant assessment indicators in greater details according to the specific and actual conditions of the corporations in different countries, so that the methodology has operability and reduces the redundancy of indicators in the assessment process.

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