

Case Study on Standards Management : Focused on Small and Mid-sized Businesses

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기업의 표준 경영 사례 연구 : 국내 중소중견기업을 중심으로

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Abstract Standards offer numerous opportunities and benefits not only to provide effective and efficient way for business goals internally, but also to increase company's competitiveness externally. However SMBs can't get have benefits from standards management due to lack of resources and awareness. The purpose of this study is to investigate the role of standard management in business hierarchy from SMBs' cases leading to raising the awareness and providing strategic implications for standards management. The utilization of Standards management was investigated by adopting Anthony framework and Miles and Snow typology targeting SMBs which have awarded the World Standards Day Prize. The results of case study indicated that standards can be used as not only a strategic tool for achieving business goal and but also an effective way for raising brand awareness in global market. This study has originality and practical value in that it enhances the awareness and provides strategic implications for standards management in global business environment.

• Key Words : Standards, Standards Management, Business hierarchy, SMBs, Case study

요약 표준은 다양한 기회를 제공하며 내부적으로 사업 목표를 달성할 수 있는 효율적이며 효과적인 수단을 제공할 뿐 아니라 외부적으로 경쟁력을 강화시켜 주기도 한다. 그러나 중소중견기업은 자원과 인식의 부족으로 표준경영이 제공하는 혜택을 충분히 누리지 못하고 있다. 본 연구의 목표는 국내 중소중견기업의 사례연구를 통해 기업 조직 구조의 차원에서 표준경영의 역할을 조사하고 이를 통해 표준경영에 대한 인식을 높이고 전략적 활용을 위한 지침을 제공하고자 하는 것이다. 세계표준의 날 행사에서 수상을 한 중소중견기업 4개를 대상으로 자료 및 심층 인터뷰를 통해 해당 기업의 표준경영 활용 사례를 조사하였다. 결과에 따르면 표준은 기업의 경영목표 달성을 위해 전략적으로 활용될 수 있으며 특히 국제무대에서의 인지도 제고를 위한 유용한 수단으로 활용될 수 있음을 확인하였다. 글로벌 경영환경에서 표준경영이 경쟁력 확보를 위한 전략적 수단으로 활용될 수 있다는 인식 제고와 지침을 마련한 실무적 가치가 있는 연구이다.

• 주제어 : 표준, 표준경영, 기업구조, 중소중견기업, 사례연구

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1. Introduction

Standards are used every day by business, manufactures, public bodies and other organizations as a tool for managing vital issues such as trade, regulation, quality, health and safety, innovation, competitive advantages[1]. Standards are something which provides, inter alia, requirement, rules, and guidelines, for a process, product or services. Standards aim at achieving the optimum degree of order in a given context[2]. Especially, the main aim of using standards in companies is to contribute business results and to the effectiveness and efficiency of the organization. Standards also offer numerous opportunities to support competitive strategies in a sustainable manner and therefore presents an efficient instrument to increase the company's competitiveness [3]. Advancing globalization is affecting more companies than ever and is getting involve in many standards issues, which are product standard, process standard, and certification etc.

The importance of standards in a global economy is well understood by global leading companies. It is certain that those organizations that are engaged in standardization initiatives tend to be better performers than those that are not[4]. Standards and standardization have been emerged as a strategic management instrument for achieving management goals. That is 'Standards management'. However, small and mid-sized businesses(SMBs) are often not aware of what is going on in standardization and its importance. This factor and the specific constraints of SMBs in terms of human resources and finance lead to a relatively low active participation in the standards management[5]. Accordingly, the purpose of this paper is to show the benefits of standards management in SMBs through case analysis.

Therefore, the main purpose of this paper is to examine how standards management is implemented in business hierarchy by employing Anthony(1965) framework and Miles and Snow(1978) typology[6,7]. It is structured as follows: first the importance of standards

and standards management in company is discussed with regard to business hierarchy and strategic perspectives. And then cases of standards management in Korea are investigated. Some concluding remarks and implications will finish this paper.

2. Research background

2.1 Standards

Standards, and standardization, are now a fact of life in all industries globally. With the growth of the linked global economy, and with the dependence of industry on the World Wide Web and the Internet for information, the importance of standards has increased substantially over the last 20 years[8]. Economic studies report that standards stimulate labor productivity and innovation, and have been calculated to make a substantial contribution to the economic growth[9].

Standards are very common in every-day life. The A4 series of paper sizes, the fitting of light bulbs into sockets, ISO 9000 requirements, McDonald's product and service specifications, and the specifications of HDTV all have one thing in common: the fact that they are used repeatedly by a large number of people and, therefore, are laid down in standards[3].

There is, however, no standardized definition for 'standards'. The word 'standards' covers a wide range. This word is used in various facets of industry, society, and life. While some sociologist defines it broadly; 'the rules by we are told we should live, and the range of possibilities presented to us when we make choices' [10], ISO/IEC defines standards officially as 'documents established by consensus and approved by recognized body that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in given context[11]. Standards can be subject to not only things but also people. These various meanings are inextricably linked together. The process of formulating, issuing, implementing and

improving standards is called standardization. This paper focuses on standards in company. Standards in company are tool for achieving efficiency and effectiveness for business goals internally and competitive advantage externally aligning with overall business strategy.

Standards and standardization are inextricably linked to all facets of company's activities and therefore provide numerous benefits[1]. Standardization in company is aimed at achieving maximum overall economy. Standards can lead to lower costs of products and service by reducing redundancy, minimizing errors, and reducing time to market. Demonstrating compliance to certain standards helps company to cross border, ensuring that products manufactures in one country can be sold and used in another. It also gives customers confidence leading to market success. Company can also lower its overall R&D costs by relying on previously standardized technologies and terminologies. Standards can be used in terms of competitive advantage externally. Especially when companies compete in global market, standards focus on product acceptance and new market entry strategically. Companies that participate actively in standards activities reduce costs, increase efficiencies, facilitate and maintain market access, and gain a more competitive advantage than those who not participate.

2.2 Standards management in business hierarchy

As the impact of standards for companies has been increased, standards management has been merged as a tool for achieving management goal and innovation. Standards management can be defined as 'management system for achieving companies' goal by using standards in various company activities such as R&D, procurement, production, sales etc.'

The role of standards management in company can be analyzed in business hierarchy. Anthony has described three levels of business hierarchy, which are strategic level, management level, and operational

level[6]. The operational level involves in the process of ensuring that specific tasks are carried out effectively and efficiently. It helps the company to produce quality products in desirable time. Management level involves in the process by which managers ensure that the resources are obtained and used effectively and efficiently in order to achieve the organizational goals. Strategic level is the process of deciding objectives of the organization, resources required to achieve these objectives and policies that govern acquisition, use and disposition of these resources.

<Table 1> Standards management in business hierarchy

Business hierarchy	Standards management in business hierarchy
strategic level	seeks to competitive advantage utilizing standards and standardization
management level	seeks to increase work efficiency and reduce the cost by process standards and simplification
operational level	involves in production process focusing g on quality and efficiency

Standards are used in those all three levels and Standards management in company can be, therefore, analyzed in business hierarchy framework as <Table 1>[12]. Standards management in operational level involves in production process focusing on quality and efficiency. Standards management in management level seeks to increase work efficiency and reduce the cost by process standards and simplification. It connects operational level and strategic level. Standards management in strategic level seeks to competitive advantage utilizing standards and standardization. Standards is a strategic weapon in this level. All those standard activities in business hierarchy can't be mutually exclusive.

Miles and Snow(1978) identified companies' identified companies' strategic types depending on how company addresses three fundamental problems facing the firm: entrepreneurial, engineering(or operational), and administrative problems[7]. The entrepreneurial problem involves how a firm deals with market position which defines a specific product or service in the market while the engineering problem concerns how a

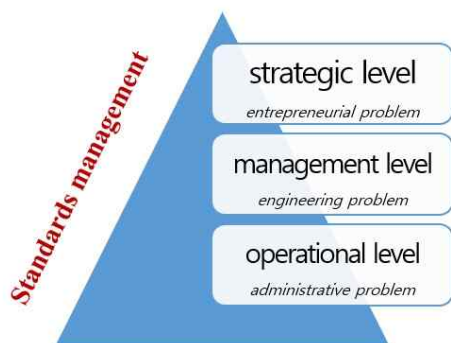
firm selects the appropriate technologies for producing and distributing the product to solve the entrepreneurial problem. The administrative problem is about how a firm should rationalize and stabilize the processes to solve the first two problems.

Standardization issue involves those three fundamental problems which are subject to business hierarchy as <Table 2>[13].

<Table 2> Fundamental problems and standards issues

Fundamental problems	Standards issues
entrepreneurial problem	strategic options which might affect the long-term competitive position of the company
engineering problem	systematic process for work efficiency and cost reduction such as quality management system
administrative problem	standardized routine tasks and services

For example, when a company drives standardization of a product in an emerging market, it requires various strategic options which might affect the long-term competitive position of the company. Decision relating those strategic options is very much an entrepreneurial problem that a company faces. A company may need to establish systematic process for work efficiency and cost reduction such as quality management system, which is analogous to engineering problem. Standardized routine tasks and services in company help to support standards management in management level and strategic level. It can be referred to administrative problem.



[Fig. 1] Standards management in business hierarchy

Figure 1 describes standards management in business hierarchy by adopting Anthony and Miles and

Snow typology.

2.3 Standards management in small companies

While how large enterprises manage trends and activities in standards management has been argued to have an immense impact on their long term competitive position in the global market place, less attention has been given to SMBs[14].

SMBs are often not aware of what is going on in standardization and its importance. The low level of awareness related to the potential benefits leads to the subsequent low level of participation in standard-setting and utilization of SMBs in standards management. The barriers encountered by SMBs in benefiting from standards management are related to some of the general characteristics of SMBs, especially lack of human resources and finance and awareness of the importance of being involved in standardization for their own company[9,15]. Even though the number of International standards which are established by Korea has been increased, only less than of 10% of them are led by SMBs.

Despite the fact that SMBs make up more than 90% of all enterprises and create substantial employment leading to economic growth, SMBs do not play a leading role in using standards and standards management. However, standards management allows SMBs to achieve efficiency and effectiveness for business goals and thereby strengthens their competitive advantage. SMBs can get have several benefits from standards management including knowledge acquisition, peer and industry recognition, access to markets, decreasing technological and market uncertainty, conformance with government policies etc.[14,16].

Therefore best practices for standards management of SMBs in this paper may provide implications for the importance and necessity of standards management in SMBs.

3. Cases analysis

Several companies, especially focused on SMBs are

investigated. In this paper SMBs include both small businesses and medium businesses according to the 'Minor Enterprises Act' and can be used relative definition of major large businesses. They are all nominated as 'best practice company in standardization' for World Standards Day Prizes by Korean government. The members of IEC, ISO and ITU celebrate World Standards Day each year, which is a means of paying tribute to the collaborative efforts of the thousands of experts worldwide who develop the voluntary technical agreements that are published as International Standards. Korean Government also award distinguished companies prizes every World Standards Day. Case studies were done by two phases: investigation of materials and interviewing with the person in charge. Cases can be categorized into 'utilization of company standards' and 'utilization international standards'.

3.1 Company standards

Company standards literally refer to standards which are used in company to optimize all recurring processes with respect to performance and efficiency. The primary purpose of company standards is to achieve business goals and customer satisfaction with 3s, which are process standardization, work simplification and product specialization. Company standards can be divided into technical standards and managerial standards [17]. The former is about product covering quality specifications, inspection specifications, control plan and so forth. The latter is about management process covering company rules, work procedures, team manuals and so forth. Technical standards usually apply to operational level and managerial standards apply to management and strategic level.

S&T Dynamics is a leading company in precision machinery industry(automotive components, machine tools, defense industry systems etc.) through effective standards management based on accumulated skills and know-how. In result, S&T Dynamics has the

largest system certifications such as ISO 9001, 14001, OHSAS 18801, AS/EN 9100, and NADCAP resulting in increasing recognition in industry. S&T also received many outstanding standards-related awards such as presidential prize for standardization and presidential prize for national quality management contest[18]. The secret of successful standards management of S&T Dynamics is to establish technical standards and managerial standards at the same time. While S&T Dynamics has focused on technical standards for product quality, it also has concentrated on managerial standards for effective management. For it, S&T Dynamics has run the special team for standardization and emphasized middle managers' role.

The case of S&T Dynamics is subject to operational level and management level. S&T Dynamics have coped with administrative problem and engineering problem with the aid of standards. Using standards S&T Dynamics can have high quality products efficiently and effectively and peer and industry recognition. Consequently S&T Dynamics growth in sales has increased to about 15%(annual average) since 2003.

Sampyo received the National Standardization Prize(Prime Minister Citation) as a result of distinguished standards management. Sampyo is a leading company in building material industry, especially in ready-mixed concrete[19]. Using company standards Sampyo focused on not only management efficiency but also communication activation. Technology related literature identified that good communication between staffs is one of important success factors in small companies[20]. The salient features of standards management in Sampyo is role of IT. Sampyo established information system for quality and facilities and provided standardized products and service. IT can be used as a tool for higher entry level[21]. Sampyo developed standardized knowledge map for business processes. Sampyo also passed and shared standardized systems with petty partners using network effect.

The case of Sampyo is also subject to operational level and management level. Sampyo established systematic and standardized process for work efficiency and cost reduction which amount 28 hundred million won yearly. It is analogous to engineering problem. In results Sampyo also gained a NET(new excellent technology) mark and several patents using standards.

3.2 International standards

Biometrics industry is emerging as a promising technology business for next generation. Techsphere is a worldwide provider of biometric verification device using Hand Vascular Pattern Recognition(HVPR) system. Techsphere invented the HVPR technology for the first time in the world and obtained patents in many countries[22]. The VP-II products utilized by the HVPR technology have been deployed globally for not only access control but also time and attendance, and recognized as reliable biometric products. While HVPR technology has high quality, Techsphere lacked brand awareness and global competitiveness as a small company. Techsphere have utilized international standards to overcome weakness of small company. Techsphere established HVPR related technology as international standards(ISO/IEC JTC1 SC37 "19794-9, Information Technology: Biometric Data Interchange Formats - Part 9: Vascular Image Data", ISO/IEC JTC1 SC37 "29109-9 - Conformance Testing Methodology for Biometric Data Interchange Formats defined in ISO/IEC 19794 - Part 9: Vascular Image Data"). International standards raised not only the awareness of HVPR as a bio recognition technology but also the brand power of Techsphere resulting in sales increasing(30~40% increasing every year). Techsphere awarded the Korean President award for standardization in 2012. That is, Techsphere utilized standards as a strategic tool. Henk de Vries(2006) also pointed out that small company can gains market share through influence in standardization[9].

The case of Techsphere is subject to strategic level. Techsphere utilized standards to cope with

entrepreneurial problem, which is how a firm deals with market position which defines a specific product or service in the market.

HCT provides technical service in Test, Measurement and Monitoring. As a national-accredited calibration/testing body, HCT maintains the measurement standards, which the core requirements of manufacturing process in industrial areas of electrics, electronics, communications and semiconductor and evaluate the appropriateness of product specification. HCT established ISO 10801 Nanotechnologies - Generation of metal nanoparticles with the evaporation/condensation method for inhalation toxicity testing and ISO 10808 Nanotechnologies - Characterization of nanoparticles in inhalation exposure chambers for inhalation toxicity testing[23]. By establishing international standards of testing and inspection method, HCT gained market expansion and awarded presidential citation on the World Standard DAY in 2013. Standardization makes it possible for company to gain market expansion and cost reduction[24]. It isn't believed that standardization of testing and inspection method provides as much network effect as other sectors. HCT case, however, shows that standardization of testing and inspection method can increase brand awareness leading to market expansion.

The case of HCT is subject to strategic level. Both cases of Techsphere and HCT implicate that standardization of excellent technology can differentiate small company itself in market by not only increasing product recognition level but also expanding market share in spite of lacked market awareness of small company. That is they can have benefits from standards management including decreasing technological risks, access to market, and peer and industry recognition[14,16].

4. Conclusions

Many cases and literatures point out that standards

<Table 3> The summary of case studies

SMBs	Category	Anthony framework	Miles and Snow typology	Outcome
S&T Dynamics	company standards	operational level and management level	administrative problem and engineering problem	quality improvement, industry recognition etc.
Sampyo				work efficiency, cost reduction, NET, patents etc.
Techsphere	international standards	strategic level	entrepreneurial problem	increasing market share and brand awareness etc.
HCT				increasing brand awareness leading to market expansion etc.

and standardization are inextricably linked to all facets of company's activities in various business levels and therefore provide numerous benefits. This paper showed that how standards management is implemented in business hierarchy by employing Anthony(1965) framework and miles and Snow(1978) typology since standards management involve three management tasks such as entrepreneurial, engineering, and administrative tasks in various business levels focusing on SMBs[6,7].

According to the result of case analysis as shown in <Table 3>, company standards usually involve in operational level and management level covering administrative and engineering problem. Company can have benefits from company standards including high quality products efficiently and effectively and peer and industry recognition, and knowledge acquisition/transfer using network effect. International standards involve in strategic level covering entrepreneurial problem. SMBs can get market access and industry recognition using standards management despite the lack of market awareness.

This paper has originality and practical implications in that it raises the awareness of importance of standards management in SMB by using case studies. Even though the number of cases are little bit small, it has significance in that those companies were awarded in World Standards Day Prizes which have public confidence. This paper also has academic implications in that it studied standards management by adopting Anthony and Miles and Snow typology. It confirmed that standards management can be strategically in business hierarchy.

It can provide a guideline on standards management both for government agent and SMB itself. SMBs are required to have a competitive advantage in order to survive in the global market[25], considering both internal competency environmental factor[26]. Each SMB must consider its individual circumstance when evaluating the benefits and most appropriate means of using standards management. It is also necessary to provide appropriate support by the government such as information offering, financial and related professional manpower support.

This study has a limitation that small number of cases is used in analyzing standards management in business hierarchy and can not be generalized. More case analysis will provide more clear understanding on the standards management. If further study will investigate standards management with mix of strategic assets(control over an installed base of users; intellectual property right; ability to innovate; first-mover advantages; manufacturing capabilities; strength in complements; and brand name and reputation) which are need to be managed successfully in standards management[27], it could provide meaningful guidelines for standards management.

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