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EXPLORING THE POTENTIAL OF LEAN PHILOSOPHY TO SPREAD THE VALUE OF SUSTAINABILITY IN THE JAPANESE AUTOMOBILE INDUSTRY: THE CASE OF TOYOTA MOTOR CORPORATION

Abstract. *The criticality of sustainability suggests the need to understand how commercial organization could implement sustainable development. This paper focuses on lean manufacturing and intends to explore the potential of lean philosophy to bring the value of sustainability into an organization. The ultimate purpose of the study lies in the comparison between the possibility of lean philosophy to lead to something remotely resembling a contribution to strong sustainability and what lean enterprise present in the sustainability report. According to the lean practices implemented in Toyota Motor Corporation and previous literature about lean philosophy, we explore how lean philosophy could assist spread the value of sustainability initiated by the top management and construct sustainable development in the corporate value chain. The result shows that the corporate philosophy could assist in achieving a consensus among all the stakeholders and mobilizing them moving towards sustainable development. The value of sustainability can also be beneficial from the process of implementing lean practices. However, the report implies that Toyota focuses more on how to utilize lean tools to achieve technological optimization in operation to address sustainability issues, rather than having a thorough understanding of the ecological limits of the planet. This paper offers some helpful reference to lean manufacturing and discuss the potential role of lean philosophy in the construction of sustainable development.*

Keywords: *constant development; Toyota Motor Corporation; source storage; company philosophy*

Introduction

The Japanese automobile industry is one of the most prominent industries in the world, and it occupies a pivotal position in Japan's national economy (Babson, 1995). In the present era, the growing environmental and social concerns worldwide contributed to the popularity of sustainability, and sustainable development has been a consensus of Japanese automakers. For the past long time, lean thinking is the leading management philosophy and value that is deeply embedded in Japanese manufacturing. Numerous contemporary and historical studies of Japanese management concern on the economic value created by lean management (Modarress, Ansari & Lockwood, 2005; Meade, Kumar & Houshyar, 2006; Hofera, Eroglu & Hofer, 2012), but few researchers explored what role of lean could play in the construction of sustainable development. In this paper, I try to investigate this problem, and my study focus on two questions: (1) analyze how lean philosophy could help spread the value of sustainability inside and outside the organization; (2) explore the potential of lean philosophy to lead to something slightly close to the concept of strong sustainability and compare with the contents in the sustainability report.

To answer these questions, we use a case study and show the potential capacity of management philosophy in Toyota Motor Corporation to help realize the sustainable

development in their business. In Japanese management and accounting, the values and norms are often repeatedly mentioned. Japan has developed its unique management culture, and keiei-rinen (management philosophy) plays an important role, which is considered essential to help understand its management practices (Hiromoto, 2009). For this study, lean is a unique management philosophy, and is defined more than a production process. It is a corporate philosophy and core value coming from the Toyota

Production System (TPS), shared and understood by all the senior managers and employees within the company. A philosophy means more people that buy into the belief, and better improvements can be implemented to facilitate the process (Vasilash, 2000). At some point, lean has become the way of doing things and influenced many aspects of the business.

Lean philosophy in this study is primarily based on analyzing lean practices implemented by Toyota and prior research of Japanese lean management. Sharing the broad concern of these studies, we found that lean philosophy can not leave the support of Japanese organizational culture and environment (McNabb & Sepic, 1995). It is vital because the lack of that culture had been blamed for numerous failures of lean practices (McNabb & Sepic, 1995). Evidence suggests that the shared philosophy may open up possibilities for assisting with establishing connections with different stakeholders

and creating conditions for everyone understanding and acknowledging the strategy made in the organization. This study explores whether lean, as a management philosophy, could construct a shared understanding of sustainability, and how they should continuously improve their operation to achieve sustainable development.

Moreover, in this paper, sustainable development is a specific intention of the lean organization that attempts to achieve. Lean philosophy could be an assistance to bring the sustainability value into the value chain. Before beginning the research, the concept of sustainability should be clear, but the definition of sustainability and sustainable development is contested and ambiguous, and it is hard to achieve consensus (Bebbington, 2001; Ball & Milne, 2005). It is noted that the sustainability discussed in this research is described as a state in which the extraction of natural capital should not exceed the acceptance of ecological life support systems (Daly & Cobb, 1989; Low & Gleeson, 1998). This perspective goes beyond the eco-efficiency and is now termed 'strong sustainability' that promotes the idea that the scale of human activities should be within the planetary boundaries (Whiteman, Walker & Perego, 2013). However, the issues of sustainability have long been a troublesome problem for society and organizations today (Gray, 2010). The result is that the concept of strong sustainability is far from embraced by the business organization. In recent years, some contemporary indicators have suggested that we are living farther and farther away from a sustainable society (IPCC, 2014). Thus, the implications of strong sustainability in the lean enterprise are worth studying.

The research also focuses on the performance relative to sustainable development reflected in the sustainability report of Toyota. We would explore whether there is an apparent gap between the contents in the sustainability report and the notion of strong sustainability. Though lean philosophy could mobilize different stakeholders to work towards sustainability and create a shared understanding of the value related to sustainability, it should be questioned whether it could gain adequate collective support beyond the organization and have enough considerations of ecology system protection. The growing social and environmental concerns demonstrate the need for sustainability, but the result illustrates that the ecological activities of the business are not related to sustainability objectives, such as planetary boundaries, inter- and intra- generational equity. Jollands et al. (2015) proposed that core values can enroll specific actors in the firm, such as energy efficiency, waste reduction, and green purchase guidelines, and so on. However, they found that these 'green' activities were still mostly in line with profit-seeking to a great extent rather than pursuing sustainability objectives. Some initiatives to develop

sustainability may go beyond the boundaries of corporate activities, and more attention will be paid on natural entities. Based on Toyota's sustainability report, this study judges the intention of their environmental activities and examines how much they have done in the construction of sustainable development.

Literature review

Concept of lean and its application in Japan

The concept of lean is a research hotspot in academia and explored from different angles by scholars ((Hayes, 1981; Womack et al., 1990; Shingo, 1989). Parkes (2015) argued that lean is a concept that helps the organization to achieve a "slim shape" by eliminating waste, increasing efficiency, and improving quality. Shah and Ward (2003) commented that lean management is a multi-dimensional way that consists of a wide variety of management practices, including Just-in-time (JIT), Total Quality Management (TQM). Some researchers explored the linkages between these practices and viewed lean management as independent but inter-related managerial systems. Liker (2004) classified lean management with 4P model: philosophy, process, people and partners and problem-solving, but the fact is that most "lean companies" stay in the level of eliminating waste and far from achieving sustainable development. He also emphasized people is the core of lean production, and it is the people, not the machine that brings the system to life. Thus, lean management requires the involvement of employees. Unfortunately, it is often ignored. All of these have proven that lean management can be viewed from different angles. The lean production model is not only considered as an alternative to traditional manufacturing models, but also the paradigm (Katayama & Bennett, 1996) for operations which has a far-reaching influence on manufacturing. Nowadays, lean management has been widely adopted by various firms and industries all over the world, but few of them can achieve a 'World Class' status like Japanese corporations, especially Toyota. This paper adopts some standpoints of Liker and assesses their potential effect on sustainable development of Toyota.

In particular, though many Japanese management methods have origins in western practice (Monden & Sakurai, 1989), they are guided by quite different management concept and purpose, and lean management is no exception. Okano and Suzuki (2007) explained that Japanese management stresses the importance of communication between top management and ordinary employees. Together with the collectivist philosophy, Japanese management can encourage all the stakeholders to commit to one goal in the continuous improvement process better. Continuous improvement is just one of the crucial principles in Toyota, combined with kanbans,

quality control, and just-in-time, all of these principles form the foundation for 'lean' philosophy. Lean as a philosophy is not a new point in academia. Moore (2001) insisted that lean should be viewed more as a philosophy than a process. Ohno (1988) acknowledged that the Toyota Production System couldn't be implemented overnight without continuous innovations lasting thirty years. Meanwhile, the Toyota Production System (TPS) is not merely a production system but a management system. In 'the Toyota way,' Liker (2004) criticized that most corporations are dabbling at the level of eliminating waste, and the lean they used to lack the heart and intelligence to obtain the sustainable advantage in the market. Lean is a business philosophy that contains long-term thinking and encourages people and develops the capacity to learn. He also highlighted that lean principles can even extend beyond the factory walls and influence the operation in the whole supply chain. Supply chain coordination should be encouraged, and many cases proved that 'partnership philosophy' can make both parties benefit from this arrangement (Bicheno, 1999). Besides, lean philosophy has strong implications with the supplier base (Bhasin and Burcher, 2006). Put these pieces together, this article will go more in-depth and lean will not be considered merely as a technique or a tool, but a philosophy that shapes the culture of Toyota and could mobilize the actors within and outside the organization. This management philosophy plays a significant role in Japanese management, and it requires all the employees to understand corporate philosophy comprehensively (Hiromoto, 2009).

The debate of sustainability

Many lean enterprises are committed to promoting sustainable development, but the definition of sustainability is defined so broadly as to be hard to achieve agreement. Sustainability issues have followed with much of the process of development of human society, and the sustainability debate can go back to a much older dispute concerning the sustainable use of the natural resource, such as fishery management (Lele, 1991). Nowadays, the term sustainability refers to an interactive relationship between human society and natural systems, is adopted by a wide range of individuals and organizations. This diversity of interpretations also leads to some unpredictable consequences. O' Riordan (1988) stated that sustainability could be utilized by both 'developers' and 'environmentalists' to justify their proposed actions, which means it can mean different things to different groups. Thus, it is not uncommon to see sustainability is used as a tool to polish the behaviors and actions superficially.

The relevant debate on weak and strong sustainability has begun since the 1990s, and it is often discussed in contemporary society (Ang and Passel, 2012). Weak sustainability permits the balancing or

trading off of environmental values for social and economic values. Simply, it assumes that natural capital can be replaced by human capital and overlap with exemptionalism. Its supporters believe that human technology, innovation, and ingenuity free them from the limitations of nature beyond other species (John, 1999). This viewpoint has existed for a relatively long time, and Hartwick (1977) proposed the savings-investment rule (also known as Hartwick rule), which is, in fact, the support of weak sustainability. He argued that if natural resources can be extracted full effectively, reinvestment may offset these losses so that natural resources will not fall over time. Finally, natural capital and human capital are interchangeable from the weak sustainability perspective. In other words, it neither considers social and equity justice issues nor the questions about absolute levels of material resources and scale of the development (Ball and Milne, 1996). More efficient use of materials and energy can create value in eco-efficiency but also can be dangerous. Narrow attention on efficiency without limiting the scale of development may eventually consume all the natural resources unconsciously.

In contrast, the concept of strong sustainability is put forward by some scholars and many thinking roots in Daly's pioneering work (1992, 1996). Strong sustainability does not accept the opinion of that trade-off between nature and human capital can solve the sustainability issues fundamentally. It propositions largely in line with the definition proposed in the publication of the Brundtland Report (WCED, 1987), which claimed that development that meets current needs should not sacrifice the needs of future generations. Under the strong sustainability paradigm, if the systems want to be sustainable, a minimum amount of different kinds of capital should be reserved (Brekke, 1997). At the same time, this approach tries to maintain a fair distribution of resources between current and future generations rather than allocating resources effectively. It stresses that human's economic activity should be within the limits of its ecological life support system (Daly & Cobb 1989; Noble & Costa, 1999). Thus, the definition of sustainability is based on the fact that human society is built upon the ecosystem and the notion of sustainable management of natural resources. Another issue that should be emphasized here is the scale of development. Just like the reasonable distribution of resources between current and future generations, the scale of development is not infinite. Daly and Cobb (1990) suggested that the solution of scale problem requires the distribution of the resource base that is fair to the future rather than merely relies on allocation. Meanwhile, concern over the life-supporting capacities of the planet's ecosystems, also makes corporations change their business practices and enhances their role in pursuing sustainability.

To date, the sustainability report has been widely accepted under the guidance of the Global Reporting

Initiative (GRI). However, such reporting is often used to drive internal changes in business behavior, mainly focus on energy and waste management (Bebbington, 2003; Stone, 1995). The phenomenon that modern corporations are more willing to embrace eco-efficiency may bring a series of problems. Hawken (2002) illustrated that narrow concern on eco-efficiency is just a small part of the sustainability, and it can mislead organizations by pursuing a more substantial economic growth in the production of wrong products via the wrong process, using wrong materials. It proves that weak sustainability is not sufficient and makes researchers shift to strong sustainability. In some industries, the concept of strong sustainability has been stressed early. For example, fisheries should ensure the natural growth exceeds mortality, so that fishery resources are available for harvest annually. Some researchers have verified that strong sustainability concept combined with the notation of critical thresholds can be used as management tools to improve management policy and performance within the fishing industry (Garmendia, Soto & Cajaraville, 2010). Meanwhile, some researchers explored the links between business and strong ecological sustainability (Wallner, 1999; Reijnders, 2000). Daly (1992) established three often-cited standards for the sustainable usage of natural resources: (1) renewable resources should not be used at a faster rate than their regeneration rate; (2) non-renewable resources should not be used at a faster rate than their sustainable renewable substitutes development rate; (3) pollution should not be emitted at a faster rate than the capacity of the environment can undertake. In the corporate level, these implications are translated into the concern on natural resource conservation, the influence of non-renewables, and the disposal of waste. With the growing interest in environmental and social issues, the implications of strong sustainability in the corporations have become one of the major topics in a recent study. In this paper, we take a view on the notion of strong sustainability and discuss whether some perspectives of strong sustainability could be achieved in the business.

Research methodology

Research methods

As mentioned above, the whole research is based on the qualitative analysis of Toyota Motor Corporation. Toyota is an ideal choice as the sample, which is typical and satisfies all the necessary characteristics of the research. The qualitative methods involve the systematic collection, selection, classification, and analysis of textual, verbal or visual data rather than relying on standardized measures and statistical analysis (Hammarberg et al. 2016). The data is collected from the

sustainability report and documents in Toyota official website www.global.toyota.com. The accessibility of the latest Toyota sustainability report ensures a high level of certainty over the authentic and accuracy of the findings. The most data used in this paper is mainly from the sustainability report and databook of Toyota from 2015 to 2018.

Case context

We use a case study method focusing on an organization, Toyota Motor Corporation in Japan. It is a 'representative' of Japanese lean manufacturing. The company was founded by Kiichiro Toyoda in 1937 and had a budding automotive business in the 1950s. Along with the lessons of Ford's mass production system, Toyota borrowed many ideas from the U.S and developed a unique but quite different approach to manufacturing, which is called the Toyota Production System (TPS). Through reducing the leading time and increasing the flexibility of production lines, Toyota gets higher quality, better utilization of resources, and higher productivity. This system is the basis of much of lean manufacturing and contributed to the success of Toyota. At the time of research, Toyota has been the largest listed company in Japan, employed approximately seventy-five thousand employees across seventeen plants in the home country. The vehicles produced by Toyota are well-known for their excellent quality, and the corporation is also the world's market leader in sales of the hybrid electric vehicle.

In the 21st century, the automobile industry is facing severe energy and environmental crisis. With the rapid growth of car ownership, nowadays automobiles account for approximately 20% of all carbon emissions. Toyota Motor Corporation has begun to issue sustainability reports since the end of last century, and the corporation has the best environmental brand image in this area. Toyota regards environmental protection as one of the most critical topics and strives to realize caring for human beings and the earth in every link of the life cycle from car development, production, and use to scrap. In 2015, the company put forward 'Toyota Environmental challenge 2050'. The corporation formulated six environmental challenges to be achieved towards 2050 and aimed to establish a future society in harmony with the community. At the same time, TPS as the leading corporate principle in Toyota was emphasized in their annual sustainability report, and persistent craftsmanship runs through Toyota's corporate survival genes. The lean thinking has become an inseparable part of the culture which influences the way of Toyota making things, including how to address sustainability issues.

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ДОСЛІДЖЕННЯ ПОТЕНЦІАЛУ МИРНОЇ ФІЛОСОФІЇ З МЕТОЮ ПОШИРИТИ ЦІННІСТЬ СТІЙКОСТІ В ЯПОНСЬКІЙ АВТОМОБІЛЬНІЙ ПРОМИСЛОВОСТІ (ДОСВІД КОРПОРАЦІЇ TOYOTA)

Анотація. Критичність стійкості свідчить про необхідність розуміння того, як комерційні організації можуть забезпечити сталий розвиток. Ця стаття присвячена ефективному виробництву і має на меті дослідити потенціал сталого розвитку задля забезпечення надійності організації. Кінцева мета дослідження полягає у порівнянні між можливістю сталого розвитку привести до чогось, що віддалено нагадує внесок у надійність, та того, що підприємство відображає у звіті про надійність виробництва. Згідно з практикою ресурсозбереження, впровадженою в Toyota Motor Corporation, і попередніми дослідженнями в галузі забезпечення сталого розвитку, досліджено, як філософія компанії може сприяти розповсюдженню цінностей сталого розвитку, ініційованих вищим керівництвом, та побудові сталого розвитку в корпоративному ланцюжку. Результат засвідчує, що корпоративна філософія може допомогти досягти консенсусу між усіма зацікавленими сторонами та мобілізувати їх на шляху до сталого розвитку. Значення стійкості також може бути корисним у процесі впровадження практик заощадження. Однак у звіті впливає, що Toyota більше зосереджується на тому, як використовувати інструменти заощадження для досягнення технологічної оптимізації в процесі вирішення проблем сталого розвитку, а не на глибокому розумінні екологічних меж планети. Ця стаття пропонує кілька корисних посилань на оцідливе виробництво та обговорює потенційну роль осмислення діяльності в побудові сталого розвитку.

Ключові слова: сталий розвиток; Toyota Motor Corporation; ресурсозбереження; філософія компанії

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