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## HOW CAN TOYOTA MOTOR CORPORATION ACHIEVE SUSTAINABLE DEVELOPMENT

**Abstract.** *For a lean enterprise which aims to construct sustainable development, we set a hypothesis that lean could bring the value of sustainability into the organization and try to explore the traveling process of sustainability value. The completion of this process also relies on the Japanese firm's unique cultural and historical background. Furthermore, lean can contribute to sustainable development at the corporate level through continuous technology and process optimization. But strong sustainability implies that the enterprise needs to do more only than focus on eco-efficiency, and it depends on the senior management understanding of sustainability to some extent. For moral and practical reasons, realizing sustainable development needs collective decision making for the common good (Ball & Miline, 2005). If they determine their attitudes to ecological systems, natural and energy conservation will be a form topic in the company. Ecological values will become an essential criterion in the appraisal of corporate performance as well as traditional economic criteria. It will assist the firm to have a more reasonable production scale, and the usage of renewable and non-renewable resources will be more brilliant in the production. Finally, it will influence the values of the firm. But it may put the firm in an ethical dilemma caused by the conflicts between profits and future generation's interest.*

**Keywords:** *Lean philosophy in Toyota; Toyota Motor Corporation; value of sustainability; business partners; Ecological values*

### Introduction

The implementation of lean practices has a long history in Japanese manufacturing, and Toyota Motor Corporation makes excellent contributions to its development. As the largest car manufacturer in Japan, the success of Toyota cannot leave without the development of the Toyota Production System (TPS). The TPS is the benchmark used throughout the world as the basis for lean thinking (Iyer et al. 2009), and it has become the most recognized symbols in lean manufacturing. For decades Toyota was applying and improving TPS in the daily activity, with the objective of 'making the vehicles ordered by customers most quickly and efficiently, to deliver the vehicles as quickly as possible' (Toyota sustainability date book 2018). Lean thinking is a core part of Toyota's management philosophy, and it requires a way of thinking that focus on customer value, removing the non-value-added waste, a pull system driven by customer demand and a continuous improvement culture (Ohno, 1988).

Though lean production has dominated manufacturing trends for several decades, many firms are struggling with their lean transformation now. Industry Week's survey illustrates that though approximately 70% of US plants have adopted lean manufacturing, only 24% achieved significant progress (Netland, 2013). It is noted that in the majority of firms where lean is implemented,

lean is merely a separated existence to improve profitability, and its implementation lacks the involvement of senior management and employees. In Toyota, lean thinking has a far deep-going and more convincing cultural transformation than most of those 'lean' enterprise in other countries (Liker, 2004). Toyota embraced lean tools and fully understood the philosophy and culture inside them. It is the people who implement lean to production and management practices, and collective participation is part of lean, and the continuous improvement culture of Toyota is supported by the workers are active in making improvement suggestions and senior managers involved in the day-to-day activities.

The control of waste makes some researchers believe that lean management can improve resource productivity with considerable sustainability implications (Larson & Greenwood 2004). Japanese lean enterprises get the most of notion of eliminating waste. They tend to subdivide non-value-adding waste in business or manufacturing process and identified seven major types of garbage. However, this is not the end of lean. A real lean enterprise is a true learning organization and encourages people and partners to use their initiatives and innovation to improve continuously. Meanwhile, the power of ingenuity and relationships is what most lean enterprises ignore. For instance, to implement just-in-time (JIT), Toyota established a world-class supplier network in Japan based on mutual respect and mutual

trust (Yasuhiro, 1993), but in western, JIT could be the cost-cutting tool that hurt the interest of suppliers. Further, Toyota devotes to working with suppliers for mutual learning of TPS (Iyer & Ananth V, 2009). It suggests the lean philosophy extend beyond the factory wall and strengthen the partnership. In order to understand the role of lean in Japanese manufacturing, it's essential to view it as a philosophy, more than a set of techniques to improve the work. This philosophy involves the continuous improvement culture, collective participation, and bond of trust with partners, along with unique Japanese management tools, becoming the core competitive advantage of Toyota in Japan.

Generally, the lean in Toyota consists of different thinking, such as kaizen (Continuous improvement), Just-in-Time, Jidoka (In-station quality), but the culture behind lean is similarly important. In the following parts, I would explore the potential of lean philosophy to help spread the concept of sustainability in lean manufacturing, and then analyze how it could construct the sustainable development in the value chain. Lean as a philosophy could create conditions for sustainability travel smoothly and widely within and outside the firm. Toyota, their suppliers, and dealers, all of them play a role on the way to sustainable development.

### **The potential of lean philosophy to spread the value of sustainability**

#### **The implications of sustainability for corporate management**

Enterprises determine to react to sustainability issues may for various reasons. Customers' concern on the firm's environmental performance may push the firm to move towards sustainable development, or they are convinced that these actions related to sustainability can enhance the reputation and establish a positive brand in the market. The auto industry has the characteristics of high energy consumptions and high environmental pollution. Thus, automakers like Toyota are easily exposed to the pressure from society and required to respond to sustainability issues. However, many firms' existing activities are not consistent with the concept of sustainability. Milne (1996) put forward that promoting sustainability and sustainable development means the going concern of natural entities, such as oil, woods, water, have to be taken into consideration, which would change the traditional measurement of companies' success. It also requires companies to have a thorough understanding of environmental change (Canter, 1999; Costanza & Folke, 1994) and a philosophy of long-term thinking. So how a lean enterprise could respond to sustainability issues? Now focus on the Toyota Motor Corporation and think the potential capacity of lean philosophy in the construction of sustainable development.

While the senior managers of a lean enterprise decide to act upon the intention of sustainability, the implementation of sustainable development requires them to have a deep understanding of this concept first. Sustainability is like a complex topic that top management has to complete. The senior managers must not only understand the customers, pressure group and government' concerns on sustainability issues, such as global warm, energy shortage, water pollution, etc. but also are capable of making practical countermeasure. How much can a firm do for sustainable development? Corporate decision-makers' understanding and attitude to sustainability issues play an essential role. The consideration of the environmental problems may influence their business decisions, which can reflect on the firm's choice of materials, the process of manufacturing, production scale, etc. Further, when the ecological limitations of some natural resource and their business activities' impact on the ecology system are taken into account, it implies that decision-makers of the firm should be more forward-looking and follow high moral standards (Ball & Milne, 2005).

Meanwhile, human's economic activities are entirely based on ecology systems, and an organization is just a small part of this system (Wackernagel & Rees, 1996). When using a specific resource, the firm is expected to think about the condition of all the organization using this resource and its availability in nature. This rethinking could contribute to more reasonable business decisions beneficial to the ecology. Though continual maintenance of the natural capitals is hard to be the determinants in their commercial decisions, even so, the involvement of this thinking means that the criteria of business success will be evolved and it is excellent progress towards sustainability objectives. It is noted that lean philosophy also promotes long-term thinking even at the expense of short-term financial goals (Ohno, 1988). It has some similarities with the notion of strong sustainability, but a fundamental difference exists between the two. Strong sustainability requires the consideration of future generation's interest, so long-time thinking of natural resource allocation and conservation is essential. Unlike the value of sustainability, lean philosophy puts more emphasis on the idea that a company's mission is more significant than earning a paycheck (Liker, 2004). Lean doesn't have the comprehensive thinking of the going concern ecology but just for the continued viability and profitability of the organization, and that is what should be recognized.

Additionally, it should be asked how effective it will be if the senior managers and department supervisors are trying to push their sustainability policy without any knowledge and understanding of the daily corporate operations. The auto industry has a complicated business process and sophisticated processing technology, and

organizational management should never be divorced from these realities. The participation of managers in operation is what lean management emphasizes, and the ignorance of this point is the reason why many firms fail in the implementation of lean. Japanese scholars criticized that the manager who is top-down and only has general is relatively ineffective (Yoshio, 1990; Ohno, 1998). In Toyota, the involvement of management in the day-to-day activities and the full understanding of their work are frequently emphasized when implementing lean management (Cusumano & Nobeoka, 1998). Within the corporate operation, the implications of sustainability in different stages may not be the same. For instance, the use of green material or the promotion of an environmentally friendly life is what should be considered in the design phase, and in the stage of delivery, the method of reducing the carbon dioxide is the point. Further, management should be aware of the potential and possibility of different existing activities to move towards sustainable development clearly: some sustainability issues exist in the process needed to be resolved immediately due to the pressure of the society or influence the entity's going concern, and some other items within the operation can be reserved because of the limitations of technology or lack of the matter of public. All of these based on that senior management has explicit knowledge of the business procedures. They have a central role in the construction of sustainable development and lean philosophy ensures they thoroughly understand the implications of sustainability in the different stages of operation. Thus, they can set reasonable and achievable targets and ensure that the company is on the appropriate way to sustainable development. In 'The Toyota Way,' Liker (2004) also stated that 'encouraging employee involvement by itself is not enough to define a Toyota leader' (p. 181). It suggests that the extensive participation of employee requires the efforts of top management. Okan and Suzuki (2007) explained that senior managers tend to improve the engagement of employee in continuous improvement process such as kaizen costing and the employee's voluntarism is also the key to this process. How can senior managers encourage employees to pursue sustainable development? Communication and trust. The vertical and horizontal communication has become a norm and routine. Lean thinking always stresses the role of people in implementing the systems, and the development of a company requires the people to work, communicate, and grow together. Put simply, the involvement of all employees and management is a crucial point of lean philosophy. Information exchanges across the levels could break down the hierarchies within the organization, and employees from different levels are encouraged to contribute to their ideas and thoughts (Martin et al., 1992). On the one hand, it nurtures an atmosphere of trust and respect in the company and

makes their staff more willing to commit to supporting the sustainability objectives of the company. On the other hand, a formal and active channel of communication ensures employees have a thorough understanding of the sustainability objectives of the organization. Thus, implementing lean practices facilitate communication inside the corporation and close the distance between ordinary employees and different levels of management. Consequently, it could provide the conditions of sustainability value shared and learned because of the full participation of staff.

### **The implications of lean and sustainability in the daily operation**

How could the value of sustainability initiated by corporate management be translated into the day-to-day operation? As mentioned before, sustainability is an ambiguous concept, so it should be more detailed and concise in practice. Earlier studies (Kazusa, 2003; Ushio & Kazusa, 2013) concluded that the simplicity and apprehensibility of accounting calculations enhance the wider communication in an organization. Similarly, the company can translate the value of sustainability into the form of accounting calculations, and these calculations suggested by the team leaders, and department supervisors can mobilize the employees to participate in the construction of sustainable development. The accounting calculation relative to sustainability in the auto industry can be various, such as emission of carbon dioxide producing per vehicle, waste produced per vehicle, the usage of oil per mile in delivery, etc. In different departments and teams, these accounting calculations can be adopted widely, and the results could be used to compare with each other and become a motivation to improve. This calculation makes the employees on the factory have a clear picture of sustainability and what they should continuous improvement in their daily work. Many lean enterprises promote the concept kaizen but fail to achieve anticipated result because the employees are confused with the aim of constant improvement (Karkoszka & Honorowicz, 2009). Kaizen is an illusory concept for them, and they lack communication with supervisors and managers, which could have helped them understand the intention of the company. In most Japanese lean enterprise like Toyota, each employee should understand the corporate philosophy and lean can make this true through organizational learning and horizontal and vertical communication. Meanwhile, employees could not only participate in the implementation of sustainable development under the guidance of lean philosophy, but they could also offer their ideas and suggestions to improve the sustainable process considering that they are the group who are most familiar with the operation.

In this way, front-line employees are willing to respond to the companies' sustainable development goals and make improvement suggestions. Hence, the sustainability concerns from society could be translated into the form of accounting calculation in the daily operation. The idea and method of Kaizen are used to improve the sustainable performance of the company through continuous technology optimization. Lean thinking could contribute to more effective and less natural resource usage in operation. However, we admit that it is more limited in creating the value of eco-efficiency and not enough to achieve the overall objective of strong sustainability.

Promoting sustainable development is a glorious goal and requires all employees to cope together. Cooperation is significant, and coincidentally, teamwork is a point always emphasized in Japanese lean manufacturing. In Toyota, cross-functional collaboration is an essential characteristic of the team (Itazaki, 1999), especially in the planning phase of the product. Running a cross-functional team requires coordinating a group of people with different statuses, positions, and skills. It is a challenge for management. So how to deal with it? While teamwork is critical, Lean enterprise should be aware of the fact that individuals work with each other requires the individuals' understanding of the production system. At the same time, it should keep the balance between individual performance and team collaboration. Just like Liker (2014) commented: 'excellent individual performers are required to make up teams that excel' (p. 186). Lean thinking has been a consensus and an important principle for the teamwork. The team membership, which is based on mutual trust and the culture which encourage the individual excellence determines that the team could react positively to the management plan of the corporation. Setting targets is also widely used in the teamwork, but it is noted that the objective is not just the measurement for rewards and punishment. People often ignore the fact that being a lean enterprise should be a learning organization first. A real lean enterprise views errors as opportunities for learning. Comparing to blaming individuals, the organization would take corrective actions and distribute knowledge (Toyota Corp, 2001). In implementing the sustainability strategy, many environmental indicators will be set, and these targets motivate the team members. The failure of achieving the objectives isn't worth worrying about, and it will be the experience and shared and leaned by different teams (Knuf, 2000). In other words, the team in lean enterprise pays more attention to what they can learn from the failure rather than the result itself. In the face of the sustainability issues which restrict the sustainable development of enterprise, the effective teamwork tends

to get twice the result with half the effort.

We would set an example of Toyota and analyze how their cross-functional teams could respond to the sustainability value initiated by top management. We choose the team in research and development (R&D) organization. The planning phase is important in the auto industry because it is the stage where knowledge around sustainability and sustainable development should be developed before putting the vehicles into factory production. For Toyota, its R&D organization is an open organization with members from various functional departments. The team includes the members from market evaluation, product planning, modeling, advance structure design, detail design, and factory management, etc (Itazaki, 1999). This team is under the leadership of the chief designer, who should thoroughly understand the sustainability value conveyed by the top management. The chief designer may consider the questions like what the quantity of renewable and non-renewable raw materials will be used compared to the industry average, what the amount of energy will be consumed under the current level of production, or what type of vehicle will approach the life of sustainability (like the low-emission car, new energy car). Solving these problems requires the efforts of the whole team; otherwise, the value of sustainability will be hard to put into practice. Meanwhile, they require accurate environmental data from the shop floor timely, and these will be the important parameters for the future designing process. Thus, the team of specialists from the various backgrounds should have discussions together, and all the departments will form their own prospect of sustainable development. Team members from technology department may be interested in adopting the green technology to respond to society's concern on sustainability; Production department is more willing to improve the existing workflow to reduce the negative impacts on the environment; Procurement department will pay more attention to the environmental influence of the materials they purchase.

However, no one is isolated in the planning phase, and sufficient information exchange between the team members is necessary. Continuous communication can ensure the emerging sustainability issues and requirements can be discussed fully, and the corresponding countermeasures are understood and accepted by everyone in the team. Based on adequate information sharing, members of the team can understand each other better and are willing to cooperate to assist in pushing sustainable development. In this way, R&D organization can receive more comprehensive information and know the visible sustainability issues within the whole operation, then improve the product

design and technical application. Furthermore, in the development process, R&D organization in Toyota has direct or indirect contact with the suppliers, dealers, and customers, and they can work together to complete the project. Addressing the sustainability issues also needs the assists from outside, and the efforts of different actors in the value chain can ensure the value of sustainability be spread in a wider space. However, it seems hard to realize in practice unless some special relationships can be established to make these business partners cooperate with the firm. In the next section, I would explore the potential of lean philosophy to spread the value of sustainability beyond the factory wall.

### **Beyond the factory wall**

Though lean philosophy could spread the sustainability value through the involvement of common employees and senior managers, moving towards sustainable development also requires more external assistance and support outside the organization. However, make the value of sustainability extend beyond the factory wall seems to be hard work. Suppliers are important partners of the company, but in most cases, they may probably stand on the opposite side. Though most firms have realized that an effective and stable supplier network is essential to the development of the enterprise, in the U.S, the action of cost-cutting tends to kill the whole effort to build this relationship (Sherefkin & Armstrong, 2003). Suppliers may respond to the sustainability concern from society, but for that reason, it is difficult for them to react actively to the firm's sustainability policy.

For a lean enterprise, JIT is a management strategy that can establish a connection with the suppliers. JIT is also the most visible and a notable characteristic of lean management, and it uses the method of removing the inventory and increasing efficiency as much as possible (Jadhav et al., 2015). JIT is also adopted by many western companies. However, their use of JIT has a visible difference with lean Japanese enterprise (Wright & Race, 2004) because there is a special relationship between suppliers and Toyota (Ledbetter, 2018), and this connection is based on total trust and solidarity.

How Toyota build trust with its suppliers under JIT? Before answering that it is helpful to start with some background context of Toyota's supplier network. Toyota's domestic suppliers have developed rapidly since the 1930s. To centralize suppliers with close capital relations, Toyota carries out strategic subdivision of supplier groups, dividing suppliers into cooperative members and independent suppliers. For cooperative members, Toyota has a majority of equity and actual control rights (Brintrup et al., 2011). At the same time,

Toyota also builds knowledge sharing mechanisms with its suppliers and promote the concept of 'coexistence and co-prosperity' through a series of actions, including establishing learning teams among suppliers, adopting the policy of employee rotation among enterprises (Tsai et al., 2008). Based on mutual trust and benefit, the objectives and interest of suppliers and Toyota are more likely to be consistent. Thus, what can be imagined is that suppliers are more likely to react actively to Toyota's concern on sustainability issues. It also creates a possibility that Toyota can work with the suppliers to address sustainability issues together. Many firms have developed the sustainability procurement guideline. Cooperating with the suppliers who have positive environmental performances, such as using renewable energy resources or promoting recycled materials, can show to the public that they are sustainable. A lean enterprise like Toyota could do more than this. The philosophy of JIT enhances the trust with the suppliers, and knowledge sharing mechanism creates more chances for communication among suppliers (Sukarma, 1997). For one thing, Toyota could convey its sustainability values to the suppliers and influence their business. The proportions of chemical substances harmful to the environment used in the material, the amount of pollution emission in production and their voluntary environmental protection activities can be the issues that Toyota concerns, and the suppliers are more willing to respond to that intention considering that they are a community of common destiny. For another thing, the knowledge sharing mechanism ensures the user experience can be shared, and the suppliers could receive assistance from Toyota in the construction of sustainable development. JIT needs its suppliers to have a strong capacity in producing and delivering, and the philosophy of lean is widely accepted by the suppliers. Lean enterprise could work with suppliers for mutual learning of the management philosophy (Sherefkin & Armstrong, 2003), and the suppliers could learn how to address some sustainability issues within operation through the notion of Kaizen. They share practices, information, and concerns, and it is easier to arrive at a consensus to move towards sustainability. Further, if the top management of a lean firm has a deep thought of the links between ecology and their business, its cooperation with the suppliers will also be affected. A relatively reasonable production scale will be negotiated with the suppliers not only based on the prediction of market demand but also the intention of natural resources preservation. The substance of materials used by the suppliers will be paid attention by the firm, especially the amount of non-renewables usage and its impact on the environment. Due to the close partnership, lean enterprise and their

suppliers can work together to address these issues. Comprehensive research of the natural resources used by all the human activities and their availability in nature is expected to be implemented by suppliers and Toyota. It can provide useful references in selecting raw materials, using production resources, and adjusting the production scale. Though it is hard to change the pattern of existing business activities, the careful consideration of natural system's productivity and diversity would change the definition of business success and mean a big step in the construction of sustainable development.

Sales network also plays a very significant role in the whole value chain because they are closest to the customer. Only the sales are completed, then the value of the products can be realized. At the same time, dealers should grasp the market trends timely and accurately, provide advice and information for group decision-making. Then the firm can design and organize production following the needs of society and provide customers with satisfactory products. The role of dealers in the construction is what can not be ignored. Their sensitivity to the market determines that they can be a guide to the production. The accurate prediction of the market trends assists the firm to effectively scheduling tasks and reasonably assigning resources (Ohno, 1988). Lean automakers always insist on the notion that 'produce as many cars as you can sell.' Dealers are the eyes of the company on the market and provide valuable information for implementing the JIT. JIT enhances the connection with the dealers because the inventory adjustments require the data from the sales system. In Toyota, though its sales system has been separated from manufacturing system since the 1950s, Toyota built solid relationships with the dealers and spent many years forming a sales network that can timely transmit market information and effectively carry out product sales. 'Eyes of the market' philosophy is a competitive advantage of many Japanese firms and helps them adjust to the most beneficial production scale (McMann & Nanni, 1995). However, the change in production scale is based on the

demands of the market, and ecological demands are excluded. In other words, profit is the primary goal, and prior to the value of sustainability. A sustainable economic activity scale requires the objective judgment of environmental capacity. If both market and ecological demands can be taken into account, the most reasonable production scale may be reached. In general, lean philosophy as a bond could enhance the relationship with the suppliers and dealers. JIT based on mutual trust creates conditions, for the value of sustainability traveling on a broader space (Figure 1).

### Conclusions

For a lean enterprise which aims to construct sustainable development, we set a hypothesis that lean could bring the value of sustainability into the organization and try to explore the traveling process of sustainability value. The completion of this process also relies on the Japanese firm's unique cultural and historical background. Furthermore, lean can contribute to sustainable development at the corporate level through continuous technology and process optimization. But strong sustainability implies that the enterprise needs to do more only than focus on eco-efficiency, and it depends on the senior management understanding of sustainability to some extent. For moral and practical reasons, realizing sustainable development needs collective decision making for the common good (Ball & Miline, 2005). If they determine their attitudes to ecological systems, natural and energy conservation will be a form topic in the company. Ecological values will become an essential criterion in the appraisal of corporate performance as well as traditional economic criteria. It will assist the firm to have a more reasonable production scale, and the usage of renewable and non-renewable resources will be more brilliant in the production. Finally, it will influence the values of the firm. But it may put the firm in an ethical dilemma caused by the conflicts between profits and future generation's interest.

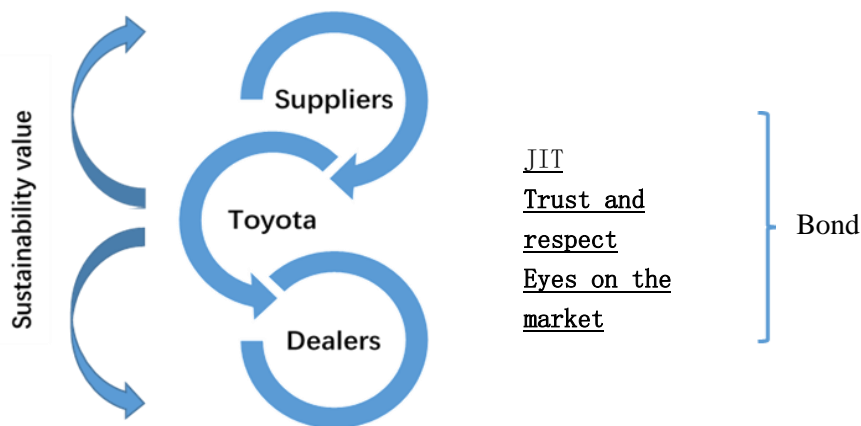


Figure 1 – Toyota and its business partners

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### ЯК TOYOTA MOTOR CORPORATION МОЖЕ ДОСЯГТИ СТАЛОГО РОЗВИТКУ

**Анотація.** Для оцінюваного підприємства, яке має на меті побудувати сталий розвиток, висунуто гіпотезу, що воно може привнести цінність сталості в організацію та спробувати дослідити подорожуючий процес. Завершення цього процесу також залежить від унікального культурного та історичного досвіду японської фірми. Крім того, *Lean* може сприяти сталому розвитку на корпоративному рівні шляхом безперервної технології та оптимізації процесів. Але сильна сталість передбачає, що підприємству потрібно робити більше, ніж зосереджуватися лише на екологічній ефективності, і це певною мірою залежить від розуміння вищим керівництвом сталості. З моральних і практичних міркувань реалізація сталого розвитку потребує колективного прийняття рішень для загального блага (Болл і Мілін, 2005). Якщо вони визначать своє ставлення до екологічних систем, збереження природи та енергії, це стане однією з основних тем у компанії. Екологічні цінності стануть найважливішим критерієм при оцінюванні діяльності компанії, а також традиційними економічними критеріями. Це допоможе фірмі мати обґрунтовані масштаби виробництва, а використання відновлюваних та невідновлюваних ресурсів стане виправданим у виробництві. Нарешті, це вплине на цінності фірми, що може поставити її в етичну дилему, викликану конфліктами між прибутками та інтересами майбутнього покоління.

**Ключові слова:** бережлива філософія в Toyota; Toyota Motor Corporation; цінність сталості; ділові партнери; екологічні цінності

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