Culture and the Toyota Production System Archetype: a Preliminary Assessment

Jan Alpenberg and Paul Scarbrough

Abstract
This chapter examines how traditional understandings of organizational cultural factors map into our understanding of the Toyota Production System. The chapter also provides a categorization of cultural elements in the Toyota archetype.

Since the 1980s the business literature has used a number of concepts to understand organizational culture. The bulk of these concepts can be seen to fit into a general rubric comprising three elements: values/assumptions; behavioural norms; rites and rituals. We use this system of categories to review the Toyota Production System Archetype (TPS Archetype) with a general aim of assessing the degree to which the TPS Archetype participates in the broad spectrum of cultural elements comprehended by the 3-element rubric.

Studies by Ahrens (1996); Bhiami (2003) and Dahlgaard & Dahlgaard-Park (2006) shows that when new tools and management control systems are introduced, they need to be adopted to the existing corporate culture and management practice in order to become successful, and this is a general understanding that is widely shared. Our examination addresses the extent to which the TPS Archetype impounds both awareness of the relation between tools and culture as well as the cultural scope of the TPS Archetype tools.

Introduction
Although the creation of the Toyota Production System (TPS) was an achievement, another achievement was the creation of the TPS Archetype and its diffusion across the globe. Due to the enormous amount of descriptive literature on the TPS, it now exists primarily as an archetype, or model, of an ideal production system in competition with the earlier Fordist, or massed production system developed in the early 1900s. As with most things, the contrast is sometimes made too sharply and there are traces of both systems in the other. However, the recent success of the TPS has lead to it being studied extensively, mainly in the professional literature, although a number of the observers are academics working in the more professionalized strands of academia. Models of the TPS’ functioning and its many parts have been developed in both piecemeal and holistic fashion, and in a variety of disciplines. There has been very little examination in the top-level academic literature, even in the area of operations management or engineering management.

Given the size and diversity of Toyota operations, the relation of the TPS Archetype elements to actual operations in a specific Toyota plants may be weak. Even so, this Archetype is the TPS or Lean Production system for almost everyone. In this chapter we examine sources of

1 Dr Paul Scarbrough was a visiting professor in Management Accounting at the School of Management and Economics at Växjö University in 2000. He is an associate professor in accounting at Brock University in St Catharines, Ontario, Canada.
the TPS Archetype and a traditional model of organizational culture is used to categorize the content.

Culture and the Business Literature

Our examination focuses on identifying relationships between the TPS Archetype and the organizational cultural factors it interacts with. Thirty years ago we would not have seen much interest in culture in the academic or professional management literature; however, culture is nowadays often mentioned in professional discussions of business methods as a key component in their use and a key component in organizational change. Culture can be examined at a number of levels, notably work group, corporate and societal. In this chapter we primarily focus on the corporate level.

In 1981 and 1982 four professional books on organizational culture came out and became best sellers:

- Theory Z (Ouchi, 1981),
- The Art of Japanese Management (Pascale and Athos, 1981),
- Corporate Culture (Deal and Kennedy, 1982) and
- In Search of Excellence (Peters and Waterman, 1982).

These four books had a great impact on professional business literature. They are some of the most-read professional books of all time, especially “In Search of Excellence”.

At the same time, there were a number of more academic writers that also participated in the introduction of culture into the mainstream of business thinking. A number of authors, including Hofstede (1980), Handy (1981 2nd ed.), and Shein (1984), are notable due to the strong acceptance of their work. Kotter and Heskett (1992) and Collins and Porras (1994) are examples of a second wave of culture-focused professional books in the 1990s.

The impact of this professional literature can be seen through an increased awareness that there is a need to match, in some way, the managerial practices with the cultural setting. One of the elements that have been most widely employed in research and professional books is the 3-element rubric first presented by Schein (1984) and followed up by a number of papers and books. A citation search in ISI Web of Knowledge revealed more than 1300 citations for Schein’s work since 1990.

The 3-element rubric

These works, especially those of Edgar Schein, established a rubric² that still appears in current business literature and academic research (Schein 1984, 1985, 1990, 1992). The basis for the rubric can be found in earlier work in anthropology (Kluckhohn 1951a, 1951b; Kluckhohn and Strodtbeck, 1961) and organization science (Thibault and Kelly 1959). The rubric has a presence in academic work but appears most extensively in the non-academic literature.

One of the first academic presentations of the entire rubric was Schein (1984). In this paper he presented a schema based on prior anthropological work consisting of three main “levels”, ranging from the not-visible to the visible (see table 1). These three levels are called: 1. basic

---

² A rubric is a well-established custom or tradition that provides rules for conduct that often includes applying a class or category view of things.
assumptions, 2. behavioral norms, and 3. rites and rituals. The rubric consists of these three “levels” and the associated definitions of the meaning of each level. Across the professional literature, the wording of the definitions varies a bit but is easily recognizable.

The least visible level, **basic assumptions or values**, is an attempt to describe underlying shared thought patterns in a group of people. It is the invisible core elements such as a collective shared vision within the organization. There is the presumption that the employees of a company have a number of shared ways of thinking and that some of these shared ways of thinking can be identified and are related to performance of some sort. There are a number of issues around this concept that are not well refined and which have been criticized. This is the most often seen level in the professional literature. For example, professional books such as “Good to Great” (Collins and Porras, 2001) and “Built to Last” (Collins and Porras, 1994) focus extensively on this portion of the rubric, as does the more academic Hofstede (1980) and Hofstede et al (1990).

<table>
<thead>
<tr>
<th>Not visible</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral norms</td>
<td>Rites/rituals</td>
</tr>
<tr>
<td>Visible</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Schein model of Culture (Schein, 1984)

The middle level, called **behavioral norms**, although not visible, is closely connected to behavior, which is visible. In looking at this level, observers attempt to derive a set of norms, like attitudes towards dress codes and punctuality, from observing the typical behaviors that can be observed. These tend to be things like behavior towards various stakeholders [internal and external], time oriented behavior (short term or long term).

The lowest or most observable level is called **rites and rituals**. This is the level that is most observable and consists of occurrences that are known and often repeated. It is also the tangible element of culture and can be seen through the language in terms of policies, procedures and acronyms of the organization (Smith, 1998). In some cases it includes retelling specific historical occurrences often from the start-up days. In the case of this chapter it would also include the visible portion of most business tools (e.g., kanban cards, Lean methods, TQM methods, etc.).

The rubric is easy to use and can be deployed to address issues in different business disciplines. Looking at the professional business literature, we see that most books concentrate on specific aspects of the three-level model, mostly the basic assumptions or values, with relatively less examination of the more visible layers. This is partly due, no doubt, to the development of the Hofstede (1980) model, which was extremely easy to use in traditional research designs, and addresses only the basic assumptions or values.

This reliance on the assumptions/values level was criticized in a review of cross-culture research on management control systems by Harrison & McKinnon (1999), they claim that there is a tendency to treat culture simplistically both in the form of its representation as a
limited set of aggregate dimensions and in the assumption of a uniformity and unidimensionality of those dimensions. There is also an excessive reliance on the value dimension of cultures, which has produced a highly restricted view of culture, and placed critical limits on the extent of understanding derived from the research to date.

For reasons that are beyond the scope of this chapter to examine, the culture rubric has not developed since it was introduced. Elements of the rubric have been used in research paper discussion sections; however it has never been subject to direct examination. Nor has the research literature developed a firm understanding of the desirability of specific contents of the levels of the rubric.

**Culture and Business Research**

One impact of the relatively weak development of the rubric over the last 30 years is that there is no development of specific elements at each level that would be most desirable. Some consensus has developed that attributes such as flexibility are desirable in most circumstances and we see some specification of elements consistent with flexibility. Additionally, there are a few, fairly abstract, attributes that seem to be accepted as universally desirable in the professional literature without traditional levels of research support, for example, learning and innovation.

Some researchers and most business people appear to believe that there is a substantial effect of culture on performance; however no one has successfully isolated an effect in a traditional research study. So, professional business books continue to present weakly supported approaches and business researchers continue to, probably properly, sneer (as in Rosenzweig, 2007).

A related behavior we have observed in the research community is the significant portion of researchers who reject any specific business method as “just another fad” based on their past research experience, which included failure to “prove” the benefits of specific methods or techniques. When talking with many researchers any mention of specific methods will return much head shaking and a litany of purported failures such as Management By Objectives (MBO), Zero-Based Budgeting (ZBB), Total Quality Management (TQM), etc. because research based on the paradigm of normal-theory statistics is unable to clearly confirm or disconfirm the success of these methods.

There is, in fact, a quite pervasive sense in academic circles that it is not correct, or even sensible, to describe the values, norms or rites/rituals needed for success. And, success is most frequently described as financial success in the sense of market capitalization, or less often, profitability. There is a sense that each situation is so local that the values, norms and rites/rituals must reflect the needs of that exact situation and thus, attempts to prescribe right methods are wrong and unsophisticated. In other words, most researchers associate study of tools with a cookbook approach and find it discreditable.

In contrast, there are many respects in which the Toyota Production System (TPS) presents a set of universally desirable elements at each of the three levels. That is not to say that the TPS presents a comprehensive set, or even a “best” set, but it does populate each level of the model with specific desirable elements that appear to be applicable across the situations faced by Toyota. The number of elements in the TPS archetype is quite high and would be difficult or impossible to examine in a traditional study.

The next section focuses on the Toyota Way Archetype and TPS in an attempt to give a deeper understanding of how the cultural aspects viewed from the traditional rubric are intertwined with the TPS Archetype.
The TPS Archetype

The TPS Archetype is largely created by a small number of successful writers. There is a substantial industry devoted to describing Toyota. The books in Table 2 are the most responsible for popularizing the thinking. The phrase “Lean Production” was introduced by Womack et al (1990). Although there are a number of important books describing Toyota processes, these are the books that created the TPS Archetype for most people.

Table 2. Books popularizing the TPS version of Lean

<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Womack [Lean Enterprise Institute founder] and Jones [Lean Enterprise Academy founder]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Machine that Changed the World</td>
<td>1990</td>
<td>Womack, James P. and Jones, Daniel T., and Roos, Daniel.</td>
</tr>
<tr>
<td>Lean Thinking</td>
<td>1996, 2003</td>
<td>Womack, James P. and Jones, Daniel T. (The second edition was a substantial update.)</td>
</tr>
<tr>
<td>Lean Solutions</td>
<td>2005</td>
<td>Womack, James P. and Jones, Daniel T.</td>
</tr>
<tr>
<td>Liker, et al.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Toyota Way</td>
<td>2004</td>
<td>Liker, Jeffrey K.</td>
</tr>
<tr>
<td>Toyota Culture</td>
<td>2008</td>
<td>Liker, Jeffrey K. and Hoseus, Michael</td>
</tr>
<tr>
<td>The Toyota Way Fieldbook</td>
<td>2006</td>
<td>Liker, Jeffrey K. and Meier, David P.</td>
</tr>
<tr>
<td>Toyota Talent</td>
<td>2007</td>
<td>Liker, Jeffrey K. and Meier, David P.</td>
</tr>
<tr>
<td>Problem Solving the Toyota Way</td>
<td>2009</td>
<td>Liker, Jeffrey K. [forthcoming]</td>
</tr>
<tr>
<td>Area Specific</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kennedy [Design, Set-based-learning]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Development for The Lean Enterprise: Why Toyota's System is Four Times More Productive and How You Can Implement It</td>
<td>2003</td>
<td>Kennedy, Michael N.</td>
</tr>
<tr>
<td>Shook [Lean Enterprise Institute][details of the system]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing to learn</td>
<td>2008</td>
<td>Shook John</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Womack, James (Foreword)</td>
</tr>
<tr>
<td>Learning to See: Value Stream Mapping to Add Value and Eliminate Muda</td>
<td>1998</td>
<td>Rother, Mike and Shook, John</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Womack, James and Jones, Daniel T. (Foreword),</td>
</tr>
<tr>
<td>Lean Production Simplified: A Plain Language Guide to the World's Most Powerful</td>
<td>2002</td>
<td>Dennis, Pascal</td>
</tr>
</tbody>
</table>
Short Description of Toyota

Before we start exploring the corporate culture within Toyota, we must acknowledge that Toyota is one of the most remarkable business success stories of all time. With an annual profit level higher than GM, Ford and Chrysler together, Toyota is a phenomenal profit generator. During the 2006/2007 fiscal year profit grew by 19.8 percent and reached 100 billion SEK. Its return on assets is approximately 8 times higher than the industry average and the company has made a profit the last 60 consecutive years. Toyota is a strong or even dominant player in almost every segment from economy to luxury and automobiles to pickup trucks. In 2008, Toyota became the biggest car manufacturer in the world and it is rapidly building new production capacity worldwide. In 2007, Toyota produced 9 366 000 cars which was an increase of 6 percent from the year before. Toyota employs approximately 310 000 people around the world, and has over 75 factories in almost 30 countries. (Toyota, 2008) Toyota also has the fastest product development process in the industry and their quality level has been top ranked for a number of years. Much of Toyota’s success is believed to come from their operational excellence (Liker, 2004).

Despite its size, Toyota appears to have many characteristics of a large “family business” with a considerable influence exercised by the founding Toyoda family (Liker, 2004). The grandson of the founder was, in fact, appointed President in late 2008. The roots of the Toyota approach are often traced back to the beginning of the company. For the most part the Toyota approach was not formalized into documents or training, but rather passed from teacher to learner in on-the-job experiences.

Toyota struggled with the tacit nature of its approach for quite some time. By the late 1980s Toyota was struggling to maintain quality and stability due to rapid growth. It became clear to senior Toyota managers that their way of thinking and acting could no longer be transmitted solely through apprentice-like relations and an effort was made to write down the distinct elements that senior management was concerned with. In the very late 1980s they began and it was only in 1990 that they finished the first formal document describing these principles. The title was, The Toyota Way (1990), and it was revised in 2001.

The Archetype

As Western business began to become aware of the TPS methods, there was a gradual dispersion of isolated pieces of the system, one of the first being just-in-time inventory methods. Through time there were a number of books written by Japanese and westerners which described elements of the system. In particular, Yasuhiro Monden was one of the

---

3 One of the authors, Paul Scarbrough, has a very clear memory of being in a doctoral seminar on management accounting in about 1983 where the group completely rejected the possibility or value of JIT inventory management. A year later when Professor Sakurai joined our seminar as co-leader we were surprised to learn the truth.
earliest, along with Shigeo Shingo. These books did not reach a popular audience although they had great impact on a small subset of business people.

The publication of “The Machine that Changed the World” by Womack et al (1990) started the more broad-based awareness of TPS methods, and, we argue, the beginning of the public understanding of Toyota processes, which we call the TPS Archetype. We make no claim about what is really happening at Toyota. In addition to the general features of the Archetype there are a number of sources of popular descriptions of more specific part of the TPS Archetype, including design (Kennedy stream in Table 2) and detailed works on value stream mapping (Shook stream in Table 2). We do not examine these more focused works in this chapter, but concentrate on the general statements of what is going on in Toyota.

In this chapter we review five of the most significant sources of the TPS Archetype: The Toyota Way (Liker, 1990), the TPS House (Liker, 1990), public displays at Toyota Motor Manufacturing Cambridge (TMMC in Cambridge, Ontario, Canada), Lean Thinking (Womack and Jones, 2003) and How Toyota became number 1 (Magee, 2007).

Culture and the TPS Archetype

In the following five sections we examine the, above mentioned, sources of the TPS Archetype and categorize their cultural elements in the 3-element rubric described earlier in the chapter. We reviewed each element and assign it to a “level” of the culture rubric. This was done independently by each researcher and differences resolved through discussion.

Items that involved physical activity or some specific display are assigned to the level, Rites and Rituals based on the public and, at times, ritualistic nature of the action. For example the use of Daily Management charts is seen at almost all organizations attempting to use lean methods, and its use is a daily action. Items that involve or suggest types of thinking or the content of thinking are assigned to the level, Behavioral Norms based on the episodic nature of the cognitive processing. Items that involve types of thinking or content of thinking that apply across a number of actions or situations are assigned to the level Basic Assumptions/Values based on the broad application of the type of thinking.

For the purposes of this chapter the nature of the items at each level are not examined. We are primarily interested in the existence of the levels and the relative rate at which different levels appear. Although the nature of what is included in the levels is important for future development of our understanding of the TPS/Lean approaches, examining the content is beyond the scope of this chapter.

The Toyota Way

One of the main works on Toyota, and a key building block of the TPS Archetype, is “The Toyota Way” (Liker, 2004). Liker is able to taxonomically categorize his observations as follows. He reports that there are four main elements which form the foundations for the norms and values that management and non-managers are supposed to follow when interacting with each other. He calls these elements:

(i) Long-term philosophy;
(ii) Right process;
(iii) Develop people and partners and
(iv) Continuous problem solving.

These elements are presented using the metaphor of genetics and presented as “the DNA of The Toyota Way” and called the foundation for TPS (Liker, 2004). This use of the word
“DNA” is similar to the usage inside Toyota. Liker expands the four basic elements into 14 specific principles as summarized below:

Long term philosophy
1 Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals.

The right process
2 Create continuous process flow to bring problems to the surface.
3 Use “pull” systems to avoid overproduction.
4 Level out the workload. Heijunka. Work like the tortoise, not the hare.
5 Build a culture of stopping to fix problems, to get quality right the first time.
6 Standardize tasks that are the foundation for continuous improvement and employee empowerment.
7 Use visual control so no problems are hidden.
8 Use only reliable, thoroughly tested technology that serves your people and processes.

Add value to the organization by developing your people and partners
9 Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others.
10 Develop exceptional people and teams who follow your company’s philosophy.
11 Respect your extended network of partners and suppliers by challenging them and helping them to improve.

Continuously solving root problems drives organizational learning
12 Go and see for yourself to thoroughly understand the situation.
13 Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly.
14 Become a learning organization through relentless reflection and continuous improvement.

The first element, long-term philosophy, is intended to communicate the importance of long-term thinking in all management decisions at Toyota, even at the expense of short-term financial goals. Our analysis assigns this item to the level Basic Assumptions/Values based on the indication that this type of thinking is supposed to apply to a large number of situations. Due to the large number of elements we do not present our classification reasons for all items. One aspect of this social commitment should be long term investments in developing people as an obligation of senior management. This is not only seen on the surface through artifacts and behaviors but also on deeper levels (through norms and values as well as underlying assumptions). An illustration of this is through servant leadership, which addresses the role of management from a value-added perspective. Because at Toyota managers are not seen to naturally add value, they have to contribute to the value-adding work of others, which, in essence, is about encouraging participation and commitment to continuous improvement. Evidence of this long term thinking can be found on display everywhere in the plants and is, for instance, formulated in the following saying posted at the TMMC plant:

“Quality first. Customer satisfaction always.”

The second element in Toyota’s value-system, according to Liker (2004), is the right process, and the intended aim is to eliminate all kind of waste in the company and strive for the right process. In the TPS Archetype, waste is almost exclusively defined with respect to customer needs. This is done through a focus on the flow of activities in order to surface problems. Fundamental for waste eliminations is also the pull system which is designed to avoid overproduction. Without a specific demand from a process downwards the value-chain, nothing is

---

4 For instance in the Toyota plant in Cambridge, Ontario (also shortened as TMMC).
produced and in that way there is no need for inventories between activities. Another systematic way to eliminate waste is the system for leveling out the workload through takt time (Heijunka). A unique feature on the behavior level is that everybody along the production line has the right and the obligation to pull the “stop cord” whenever quality problems occur (Jidoka) and the importance of visual control in order to avoid hidden problems. Jidoka is explained by Liker (2004) as automation with a human touch and it refers to building in quality in the products and designing operations and machinery in a way that workers are not tied to the machines and are free to perform value-added work. Standardized task definition is Toyota’s way to systematically work with continuous improvement, Kaizen. There should be a clear instruction to every employee how to conduct every activity and in this way allow the workers to perform value-added work. The last part of the second element is to only use reliable and thoroughly tested technology (Liker, 2004).

The third element is called develop people and partners and is focused on adding value through growing leaders within Toyota who live the philosophy. This people-supporting element consist of both the unscripted daily behavior of leaders and team members working cooperatively to get the job done, as well as the formal structured processes like quality circles, early symptom investigations and scheduled meetings. This work can be seen as the Artifact and behavior norm level of culture through, for instance, job rotation, 5-Why questions, 5S, daily safety meetings and energized leaders. On the behavioral norm level this is transparent through clear standards, two-way communication and focus on the problem and not on the person. The underlying assumptions are that leaders are teachers and coaches; continuous commitment to a safety culture and leaders that support those workers that add value. The leaders and workers at Toyota are expected to show respect towards each other and the leaders are supposed to develop and challenge the workers and the different teams. Leaders are also expected to be role models in their way of doing business and Toyota emphasizes the importance of having leaders who understand the daily work in detail which enables them to be the best teacher of the company’s philosophy.

Continuous problem solving is the fourth element in Liker’s categorization of Toyota’s value system. Again, we see how Kaizen is intended to drive continual organizational learning. One way to accommodate this learning is to make decisions “slowly by consensus, thoroughly considering all options and rapidly implement the improvements”. The decision process also requires the manager to “go and see for yourself” in order to thoroughly understand the situation (Genchi Genbutsu).

Examining the Liker (2004) model using the lens of the culture rubric yields the assessment in Table 3. Due to the large number of elements we do not present a complete description of how we arrived at the categorization for each item.

<table>
<thead>
<tr>
<th>The Toyota Way</th>
<th>Our assignment to Cultural Element Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item as seen in the source document</td>
<td>Basic Assumptions/Values</td>
</tr>
</tbody>
</table>

Table 3. Categorization of the elements in The Toyota Way (Liker, 2004).

This table contains a list of TPS Archetype elements in the leftmost column and a categorization, done by the authors, of each item to a cultural “level” in the three columns on the right. Grey cells in the three rightmost columns indicate unclear assignment.
<table>
<thead>
<tr>
<th>Long term philosophy</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals.</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The right process</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Create continuous process flow [x] to bring problems to the surface [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>3. Use “pull” systems [x] to avoid overproduction [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>4. Level out the workload Heijunka [x] Work like the tortoise, not the hare [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>5. Build a culture of stopping to fix problems [x] to get quality right the first time [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>6. Standardize tasks [x] that are the foundation for continuous improvement and employee empowerment [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>7. Use visual control [x] so no problems are hidden [y]</td>
<td>Y X</td>
</tr>
<tr>
<td>8. Use only reliable, thoroughly tested technology [x] that serves your people and processes [y]</td>
<td>Y X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Add value to the organization by developing your people and partners</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Grow leaders who thoroughly understand the work [x] live the philosophy [y] and teach it to others [z]</td>
<td>X Y Z</td>
</tr>
<tr>
<td>10. Develop exceptional people and teams [x] who follow your company’s philosophy.</td>
<td>X ?</td>
</tr>
<tr>
<td>11. Respect your extended network of partners and suppliers [x] by challenging them [y] and helping them</td>
<td>X Y Z</td>
</tr>
</tbody>
</table>
After this short look at the Liker (2004) development of the TPS Archetype, we will take a look at a part of the Archetype derived from Toyota internal documentation: the TPS House.

**The TPS House**

Part of the difficulty in making the TPS system transferable is that it is extremely complex and contains a large number of unique and interconnected elements. Fujio Cho, a student of Taiichi Ohno and now chairman of Toyota Motor Corporation developed the TPS House to aid in communicating the large number of elements and their interconnectedness. (See figure 1).

The “TPS House” diagram is used by Toyota in order to illustrate the structure of the manufacturing system and ultimately to try and communicate to everyone within the company how to build the best car for the best price. The house metaphor was used because it was felt that it communicates the structural nature of the system. A house is strong only if all elements are simultaneously strong, e.g., the roof, the pillars and the foundation. One weak link weakens the entire house. The complexity of the TPS is so great that the use of a visual metaphor was believed to be important (Liker, 2004). This metaphor is widely used in Toyota as well as other organizations, using TPS Archetype methods, such as the Swedish truck manufacturer Scania. This figure is now one of the most widely recognized symbols of the TPS Archetype.
The overall goals of the TPS Archetype can be found on the roof in figure 1 and it includes: best quality; lowest cost, shortest lead time; best safety and high morale. These goals are followed up in every production unit and performance feedback is supposed to be given to employees in both management and non-management positions. These goals form the ultimate desirable output for the “TPS-house”.

The center of figure 1 is all about the people in the system. The first goal of the “TPS house” is widely understood as waste reduction and it is done through people who are trained to see waste and solve problems at the root cause through a constant focus on the question why. In order to detect and eliminate waste the following eight categories of waste are used: overproduction; waiting; unnecessary transport; over-processing or incorrect processing; excess inventory; unnecessary movement, defects and unused employee creativity. This is the heart of the TPS and for the most part this means reducing the amount of resources used without reducing customer value. Waste reduction is pursued with a level of commitment that may be unmatched. The founder of TPS (Ohno, 1998) expressed the idea the following way:

---

5 At the Toyota plant in Cambridge, Ontario, Canada, (TMMC) we noticed that feedback on four of the goals (safety, quality, performance and cost) was given to the manufacturing workers. The high morale goal is not part of the day-to-day feedback.
“All we are doing is looking at the time line from the moment the customer gives us an order to the point when we collect the cash. And we are reducing that time line by removing the non-value-added wastes.”

One of the foundation elements, *levelized production, or heijunka*, is the other focal element of the system. This element is much less known or understood. It can be viewed as *smoothness in operations*. This is also understood to be within the scope of customer value and has to do with people and the way they work together. This is also pursued with unmatched vigor through for instance careful selection of people, cross training and the ways goals are set and decisions are made.

Since the only way to have smoothness between functions with different rates of production is inventory or slack time, there is a great deal of tension between waste reduction and smoothness. This tension has not been well documented in the professional or academic literature, yet this creates a need for constant worker observation, reflection and refinement. (Liker, 2004)

The first main pillar of the “TPS house” is *jidoka*, which, as mentioned earlier, can be translated as automation with a human touch. The meaning of *jidoka* is to build in quality as you produce. This is primarily done through designing operations in a way that the workers are not tied to machines and are free to perform value-added work. It is also done through the second part of *jidoka*, which is to never let a defect part pass into the next station of the production line.

The second main pillar is called Just-in-time. It basically makes sure the right part in the right quantity is in a certain spot at the right time. The purpose of this pillar is to remove the inventories used to buffer operations against problems that may arise in the different steps of the production chain. Essential to reducing the inventories is demand driven (pull) planning of the takt time in order to have a continuous flow of products. A quick changeover of the machines along the production line makes this possible.

<table>
<thead>
<tr>
<th>TPS House</th>
<th>Our assignment to Cultural Element Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item as seen in the source document</td>
<td>Basic Assumptions/Values</td>
</tr>
<tr>
<td>Best Quality – Lowest Cost – Shortest Lead Time – Best Safety – High Morale (through shortening the production flow by eliminating waste)</td>
<td>X</td>
</tr>
<tr>
<td>Just-in-time</td>
<td>Right part, right amount, right time</td>
</tr>
<tr>
<td>Takt time planning</td>
<td>Continuous flow</td>
</tr>
</tbody>
</table>

Table 4. Categorization of the elements in the The TPS House (Liker, 2004)

This table contains a list of TPS Archetype elements in the leftmost column and a categorization, done by the authors, of each item to a cultural “level” in the three columns on the right. Grey cells in the three rightmost columns indicate unclear assignment.
Integrated logistics [y]

<table>
<thead>
<tr>
<th>People [x]</th>
<th>Teamwork [y]</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection [x]</td>
<td>Common goals [z]</td>
<td>X</td>
<td>Z</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>X</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

Waste Reduction [x]
Genchi Genbutsu [y]
5 Why’s [y]

Jidoka [x]
Make problems visible [x]
Automatic stops [y]
Andon [y]
Person-machine separation [x]
Error proofing [y]
In-station quality control [y]
Solve root cause of problems (5 Why’s) [y]

Leveled Production (heijunka)

Stable and Standardized Processes

Visual Management

Toyota Way Philosophy

The last part of the “TPS house” diagram is the foundation, which consists of: the Toyota Way; visual management; stable and standardized processes and leveled production (heijunka). Each part of the “TPS house” is by itself critical, but more important is that they reinforce and support each other. The metaphor of “house” is intended to show that the elements are part of a larger whole. It is interesting that even though the TPS House is a very compact presentation, it reveals elements at all culture levels.

**TMMC Public Display**

In this section, a short summary of the TPS Archetype from TMMC is presented. The content was communicated through a company visit at TMMC. The overall idea of what Toyota stands for can be summarized in these three simple words: “make things better” (Toyota, 2008). Kaizen or continuous improvement is presented as the way of life and the way to improve the products and the processes every day, and the goal is to “make great cars even better”. The commitment for 2008 at TMMC includes supporting the environment through the products, the operations and the organizations that Toyota works with. The commitment also includes to take a lead in corporate social responsibility and to expand production. In a short presentation film at TMMC, three main concepts are presented: 1. Safety; 2. Quality; and 3. Efficiency (which is divided into performance and cost). These dimensions are the key areas communicated in signs all through the plant. Visitors and employees can clearly see the importance of safety when reading a list of twelve critical behaviors for everyone’s safety at the plant gate and in other spots throughout the plant. This list is not presented in this chapter. In presentation material from TMMC the main content in TPS is summarized with the following words:

- Perfection as the ultimate goal
- No more than four hours of inventories
• Ensure quality
• Team members enforce their own quality control
• Only customer order
• Responsibility
• Team work

The information in this list of public displays is, by its nature, more sparse than the written documents, however even here there is some evidence of cross level impact. In table 5 the elements are categorized into the three levels used in this chapter.

<table>
<thead>
<tr>
<th>TMMC Tour</th>
<th>Our assignment to Cultural Element Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item as seen in the source document</td>
<td>Basic Assumptions/Values</td>
</tr>
<tr>
<td>Perfection as the ultimate goal</td>
<td>X</td>
</tr>
<tr>
<td>No more than four hours of inventories</td>
<td>X</td>
</tr>
<tr>
<td>Ensure quality</td>
<td>X</td>
</tr>
<tr>
<td>Team members enforce their own quality control</td>
<td></td>
</tr>
<tr>
<td>Responsibility</td>
<td>?</td>
</tr>
<tr>
<td>Only customer order starts work</td>
<td></td>
</tr>
<tr>
<td>Team work</td>
<td></td>
</tr>
</tbody>
</table>

**Lean Thinking**

In this section a fourth source for the Toyota Archetype is presented. One of the first book titles that attempted to communicate the secrets behind Toyota is Womack et al (1990). In their early bestseller the following four principles of what they call “lean production” is presented:

• Teamwork
• Communication
• Efficient use of resources and elimination of waste
• Continuous improvement
The first principle behind lean production, according to Womack et al (1990), is teamwork, and it consists of the idea that teams are put together for development purposes and that the members come from different functional areas. Each member retains their ties to their functional department, but during the life a certain program, they are under the control of the shusa (project leader). The idea with teamwork can also, according to Womack et al., be seen all through the manufacturing process and their responsibilities are ultimately continuous improvement. Secondly, communication plays an important role in Toyota. Open and straightforward communications within the teams eliminate potential conflicts and delays within the daily operations and development activities. Thirdly, efficient use of resources and elimination of waste, is a key element in the lean enterprise. The last principle in Womack et al (1990) is continuous improvement. The essence in this principle is that incremental improvements are supposed to take place all the time and they are also expected to be a natural part of both the ongoing operations and the development processes. As a consequence of this principle the learning curve is much steeper than in most mass production companies. This gives Toyota an ongoing opportunity to add value (adding attributes or lowering costs) to the products.

Six years later Womack and Jones (1996) published a second book with an even stronger focus on lean thinking. The following five key principles are based on the Toyota model, which combines operational excellence with value-based strategies to produce steady growth:

- Precisely specify value by specific product
- Identify the value stream for each product
- Make value flow without interruptions
- Let the customer pull value from the producer
- Pursue perfection

Womack and Jones (1996) argue that the starting point for the lean company is to precisely specify value by specific product. The concept of value is defined and perceived by the ultimate customer and created by the producer. Therefore every company needs to fundamentally rethink value from the perspective of the customer. In companies that have not adapted the lean perspective, managers tend to say “this product is what we know how to produce using assets we’ve already bought, so if customers don’t respond we will adjust the price or add bells and whistles”. The second principle described by Womack and Jones deals with identifying the value stream for each product. The value stream is the set of activities required to bring a product/service from an idea to production launch (problem solving), from order-taking to delivery (information management) and from raw material to a finished product in the hand of the customer (physical transformation). To make the value-creating steps into a flow without interruptions is the third principle in Womack and Jones (1996). This means moving from organizational departments to value creating processes. The fourth principle is letting the customers pull the product from the producer instead of having the producer pushing products, often unwanted, onto the customers. Elimination of inventories and rethinking economy of scale are consequences of this principle. Finally, pursuing perfection is the fifth principle of lean thinking. In order to spur perfection, transparency for everyone is essential and in that way it’s easier to discover better ways to create value within the organization.
Table 6. Categorization of the elements and principles in Womack & Jones (1996) and Womack, Jones and Roos (1990)

This table contains a list of TPS Archetype elements in the leftmost column and a categorization, done by the authors, of each item to a cultural “level” in the three columns on the right. Grey cells in the three rightmost columns indicate unclear assignment.

<table>
<thead>
<tr>
<th>Womack &amp; Jones 1996, 2003</th>
<th>Our assignment to Cultural Element Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item as seen in the source document</td>
<td>Basic Assumptions/Values</td>
</tr>
<tr>
<td>Precisely specify value by specific product</td>
<td></td>
</tr>
<tr>
<td>Identify the value stream for each product</td>
<td></td>
</tr>
<tr>
<td>Make value flow without interruptions</td>
<td></td>
</tr>
<tr>
<td>Let the customer pull value from the producer</td>
<td></td>
</tr>
<tr>
<td>Pursue perfection</td>
<td></td>
</tr>
<tr>
<td>Womack, Jones and Roos 1990</td>
<td></td>
</tr>
<tr>
<td>Teamwork</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
</tr>
<tr>
<td>Efficient use of resources and elimination of waste</td>
<td></td>
</tr>
<tr>
<td>Continuous improvement</td>
<td></td>
</tr>
</tbody>
</table>

How Toyota became number one

In this section a fifth source to the elements of the Toyota Archetype is presented. According to Magee (2007) TPS is seen as a collection of manufacturing methods that incorporates three key philosophies. These are: (i) customer first; (ii) employee satisfaction and (iii) company stability. The list of elements that has contributed to Toyota’s success is summarized by Magee (2007) with the following words:

- Diligently apply the right pursuits
- Strive for continuous improvement
- The power of humility
- Rid all that adds no value
- Improve quality by exposing the truth
• Raise the bar to unreachable heights
• Favor long-term strategies over short term fixes
• Learn the customer, live the customer
• Take time to study, then implement with speed
• Let failure be your teacher
• Cultivate evolution
• Plan big, execute small
• Manage like you have no power
• Carefully cultivate and support partners
• The power of paranoia

The right pursuit behind Toyota can, can according to Magee (2007) be seen as a philosophy based on serving and respecting people, including its employees, its customers and the wider public. The second element is the striving for continuous improvement (kaizen), and it is one of the founding core principles that Toyota never has wavered from. This principle can be summarized by the following quote: “Good can always be better. Even great can be greater” (Magee, 2007). Through creative employee contributions, continuous improvements aim to remove waste and improve product quality and profitability. The power of humility summarizes the equality among workers (managers and non-managers) at Toyota. The traditional differences in importance between managers and non-managers are not observed at Toyota according to Magee. Workers at Toyota live according to the philosophy of frugality, humility and respect for each others. Elimination of the things that do not add value (muda) is a central component to Toyota’s success and one of the elements in TPS. Clutter and lack of order is distracting and therefore has no place in the Toyota system. Seven types of waste are identified in TPS and remedies for elimination are given. Improving quality by exposing the truth is another element in TPS. The idea is, according Magee (2007), that workers have the responsibility to pull the cord immediately when problems are recognized. Thereafter the root cause to the problem is sought and both managers and non-managers are expected to go and see the root problem themselves. To solve the problem immediately is crucial.

To raise the bar to unreachable heights is done in order to make sure that the product is way above the competition in quality and value. The launching of the luxurious Lexus models can, according to Magee (2007) work as an illustration of Toyota’s ability to set its sight exceptionally high and then clear the bar. The idea of favoring long term strategies before short term fixes is a well established business practice in Japan. In addition to this cultural tendency, Toyota focuses on the future largely because the leadership is committed to long term outlook in order to respect the people within the organization. The temptation of reaping short term financial gains has been balanced within Toyota and more of a traditional family business approach to financial bottom lines can be seen. Toyota’s long term focus begins at the top and the stock price has little influence on decisions made. To learn and live the customers, is another element in TPS. Hubris is considered to be a silent killer of business and therefore Toyota is making sure no arrogance is sneaking in to their way of listening to the customers. Toyota nurtures a customer-sensitivity and is willing to listen, learn and humbly make compromises. Furthermore the importance of taking time to study and then implementing with speed is considered to be typical for Asian decision making. The experience from the NUMMI-venture together with GM illustrates this process within Toyota. Moving ahead slowly and collectively when studying potential opportunities and learning a
new market. On the other hand, when the decision is made, Toyota moves extraordinarily quickly and their speed in executing plans is superior to other companies in the industry (Magee, 2007). The principle to **allow failure to be your teacher**, Toyota culture seems to accept that even the greatest companies also are flawed and routinely make mistakes. Line-stopping and other alarm systems are used to highlight problems. A systematic approach to problem solving is used by Toyota and to avoid problems become an obstacle for improvements. The element of **cultivating evolution**, which includes the ability to adapt to communities in which Toyota operates, is considered to be one of the more important aspects of the Toyota Way according to Magee (2007). Change offers an opportunity to learn and the Toyota culture is about not assuming one is right, but striving to get accepted principles uniformly in place so that rightness ultimately prevails.

Toyota is one of the most powerful global corporations in the world, but it operates like a **unified collection of smaller localized businesses**. In every country they tend to assimilate into the local conditions and at the same time keep the uniqueness of being a Japanese company. To be a leader at Toyota demands the person to be more of a facilitator than a dictator, this is expressed through the following quote **“manage like you have no power”** (Magee, 2007). Toyota management system encourages leaders to empower team member to think and act on their own is one of the most essential elements of the Toyota culture. Responsibility without authority is commonly seen through a matrix structure within the company. **Cultivating and supporting partners** is done through a number of different activities. This is seen for example in hiring new employees who best fit the company rather than having the best resume. The last element is the **power of paranoia**. The ever-present fear of failure is one of the innate traits that have made all the difference for Toyota during it decades-long continual rise in efficiency, service, strength and power (Magee, 2007).

### Table 6. Categorization of cultural elements in Magee (2007)

This table contains a list of TPS Archetype elements in the leftmost column and a categorization, done by the authors, of each item to a cultural “level” in the three columns on the right. Grey cells in the three rightmost columns indicate unclear assignment.

<table>
<thead>
<tr>
<th>Magee, 2007</th>
<th>Our assignment to Cultural Element Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item as seen in the source document</td>
<td>Basic Assumptions/Values</td>
</tr>
<tr>
<td>Diligently apply to the right pursuits</td>
<td></td>
</tr>
<tr>
<td>Strive for continuous improvement</td>
<td>X</td>
</tr>
<tr>
<td>The power of humility</td>
<td>X</td>
</tr>
<tr>
<td>Rid all that adds no value</td>
<td></td>
</tr>
<tr>
<td>Improve quality by exposing the truth</td>
<td>X</td>
</tr>
<tr>
<td>Raise the bar to unreachable heights</td>
<td>X</td>
</tr>
</tbody>
</table>
Favor long-term strategies over short term fixes
Learn the customer [X] | live the customer [Y]
Take time to study [X] | then implement with speed [Y]
Let failure be your teacher
Cultivate evolution
Plan big, execute small
Manage like you have no power
Carefully cultivate and support partners
The power of paranoia

The five sources described above capture a substantial portion of the TPS Archetype. As can be seen there it is a substantial overlap between the presentations. The overlaps are probably the most solidly established portions of the Archetype.

One striking feature is the frequency with which many elements of the TPS Archetype are formally stated in such a way as to include both visible and non-visible, or deep, elements. There are relatively few items for which there is no visible enactment, and few visual enactments of elements without an associated Assumption or Norm.

**Discussion**

We have introduced the concept of the TPS Archetype and examined the content from five sources of the Archetype using the traditional lens of the culture rubric. The five sources used in this chapter are representative of the sources of the Archetype, but not exhaustive. We do not examine the nature of the content of TPS elements. Although an important issue, it is beyond the scope of this chapter. Further examination of both the sources and content of the Archetype is warranted. The culture rubric is used as the lens for this chapter without a critical examination of its effectiveness for either research or professional study. Further examination and development of the rubric would assist in understanding complex phenomena such as the TPS Archetype.

The primary observation from our study is that the TPS Archetype is extremely comprehensive in the sense of occupying multiple levels of the culture rubric across multiple areas of practice. To reiterate, the TPS Archetype presents tools across a large number of organization meta-areas such as quality, cost, improvement, etc. The bulk of these Archetype tools are connected to specific Norms or Values, i.e., two or more levels of the traditional culture rubric are connected, as seen in the comparison tables.

It would be difficult to imagine another organization producing a similar description of related methods. For example it is not clear that GM, or any other western company, had such a comprehensive model of internal functioning, written or tacit, prior to exposure to the TPS
Archetype. There are a number of organizations that appear, from reading the popular press, to have developed some practices similar to the core of the TPS Archetype [specifically a very intense culture of frugality or a long-term orientation], without developing the same level of complex and interconnected tools. They include: Svenska Handelsbanken, Scania, IKEA, Southwest Airlines and Yamazaki Mazak [machine tools]. Examination of these and similar organizations would be of interest for further research.

Some similarities can be seen between the TPS Archetype and other quality-focused approaches such as TQM and 6-Sigma. For example, the focus on error reduction, as well as the focus on production-level operations as the main locus of effort are very similar. Both of these methods are described as involving multiple areas of practice and, to some extent, multiple culture levels. In both cases we speculate that it is less comprehensive than with the TPS Archetype, although this paper does not examine practices other than the TPS Archetype.

Conclusions

As stated in the introduction, our goals in this chapter are: 1. To address the extent to which the TPS Archetype impounds both awareness of the relation between tools and culture, and 2. To address the cultural scope of the TPS Archetype tools. Our assessment is that the TPS Archetype clearly impounds an understanding that the tools and cultural context are linked. This assessment is based on the pervasive linking of tools (rites and rituals) to their cultural supporting element (assumption/value or behavioral norms) throughout the various sources of TPS Archetype content. All the sources present substantial numbers of both Norms and Rites/Rituals. In some cases, mainly the Liker (2004) material, this linkage is explicit for many items. In other sources the link is less explicit and may consist only in that both Norms and Rites/Rituals are listed separately as elements. Based on the purposes listed above, we do not examine the nature of the levels, however it does appear that for two of the sources (The Toyota Way, and The Machine that Changed the World) there are few Rites/Rituals that are not connected with a Norm or Assumption/Value. As we note below, this may add resilience to the system.

The Values/Assumptions level is not observed as often, although all sources have at least one element that appears to be at that level. The relatively small number of values makes sense in that values/assumptions are more basic and any given Value/Assumption can support a variety of Norms and Rites/Rituals. In other words, precision in defining of the Values/Assumptions may be less important than in defining Norms or Rites/Rituals.

The TPS Archetype appears to have a large scope, in the sense that all levels of the culture rubric are impacted substantially. The greatest impact is at the level of Behavioral Norms and the level of Rites and Rituals. This implies both fragility and robustness along certain dimensions. For example to function with highest effectiveness participants have a difficult balancing act across both organizational functions and employment hierarchy levels. Reduced performance in any (cultural) location could lead to substantial reductions in overall effectiveness. Also, but with the opposite effect, if the system is understood to be a holographic system in the sense of Morgan (1996 2nd ed.) its functioning may be moderately effective without constant upper management intervention since many elements may be self-reinforcing and in fact, self-regenerating since they consist of multiple levels. That is, a Norm may be able to [re]create appropriate Rites and Rituals rather than have them be injected from outside.

Further, the TPS Archetype is so comprehensive that it would be difficult to regard it as a tool, or even set of tools. Some indication of the difficulty of attempting wholesale adoption of TPS Archetype practices can be inferred from the comprehensive nature of the system. It
would be almost impossible for an organization to manage change of this size as a single project. This examination also suggests that the focus on the purposes of the tools should be as central as the tools themselves.

Traditional research methods would be very unlikely to validate individual TPS Archetype tools due to the variance introduced by the other TPS Archetype tools as well as the usual environmental issues. Also, examining the tools as a whole with traditional research methods would also be almost impossible since only Toyota is known to have a complete implementation of the TPS Archetype. So unless a researcher can develop an index of both “effectiveness of TPS Archetype implementation”, as well as “completeness of TPS Archetype implementation” the study would resolve to comparing Toyota performance with everyone else, not much to gain there.

It is possible that the current dominant (and growing) research methods cannot be brought to bear on the TPS Archetype issue, in part due to the comprehensive nature of the system. Our traditional, normal theory statistics, methods focus on isolatable effects in otherwise stable systems. In fact, the concept of the experiment or quasi-experiment is to isolate the impact of specific events on other events. In the face of large volumes of simultaneous events, these methods may not be effective. Also, in the face of multiple continuous changes in the system, the ability to isolate discrete changes is limited.

Overall, this chapter brings some clarity to the scope and intricacy of the TPS Archetype by sharpening our perceptions of its connections with different levels of human participation in the organization.

Acknowledgements
This chapter is written in honor of the four accounting professors who are retiring from School of Management and Economics at Växjö University. It is fair to say that the influence that Lars-Göran Aidemark, Göran Andersson, Torbjörn Bredenlöw and Tomas Prenkert has had on the accounting faculty and on thousands of graduates is beyond words. You have taught the fundamentals and the essence in both managerial and financial accounting. You have challenged students to express their thoughts and ideas with the right concepts in the right context. You have taught the importance of definitions, structure and systems. You have set the quality standard for the accounting department and without you it’s going to be an empty place. It is now up to the rest of us to fill the gap and to continue the work you have begun. It has been a great privilege to get to know all four of you and to be your colleagues. This chapter is our way to express our respect and thankfulness for all the things you have done.

The theme for this chapter is taken from an ongoing research project that deals with diffusion of advanced cost management methods within organizations. The fact that all four of you have written and lectured about advanced cost management methods gives us the opportunity to link this chapter to something that hopefully can be of interest for all of you.
References


Harrison, Graeme L. and McKinnon, Jill L. (1999), Cross-cultural research in management control systems design: a review of the current state, Accounting, Organizations and Society, 24, 483-506.


———, Bram Neuijen, Denise DaVal Ohayv, and Geert Sanders (1990), Measuring Organizational Cultures: A Qualitative and Quantitative Study Across Twenty Cases, Administrative Science Quarterly, 35, 286–316.


Rosenzweig, Phil (2007), *The Halo Effect ... and the Eight Other Business Delusions that Deceive Managers*, Free Press.


Toyota (2008), Presentation material


