

How Statistical Process Control Was Misrepresented to US Audiences

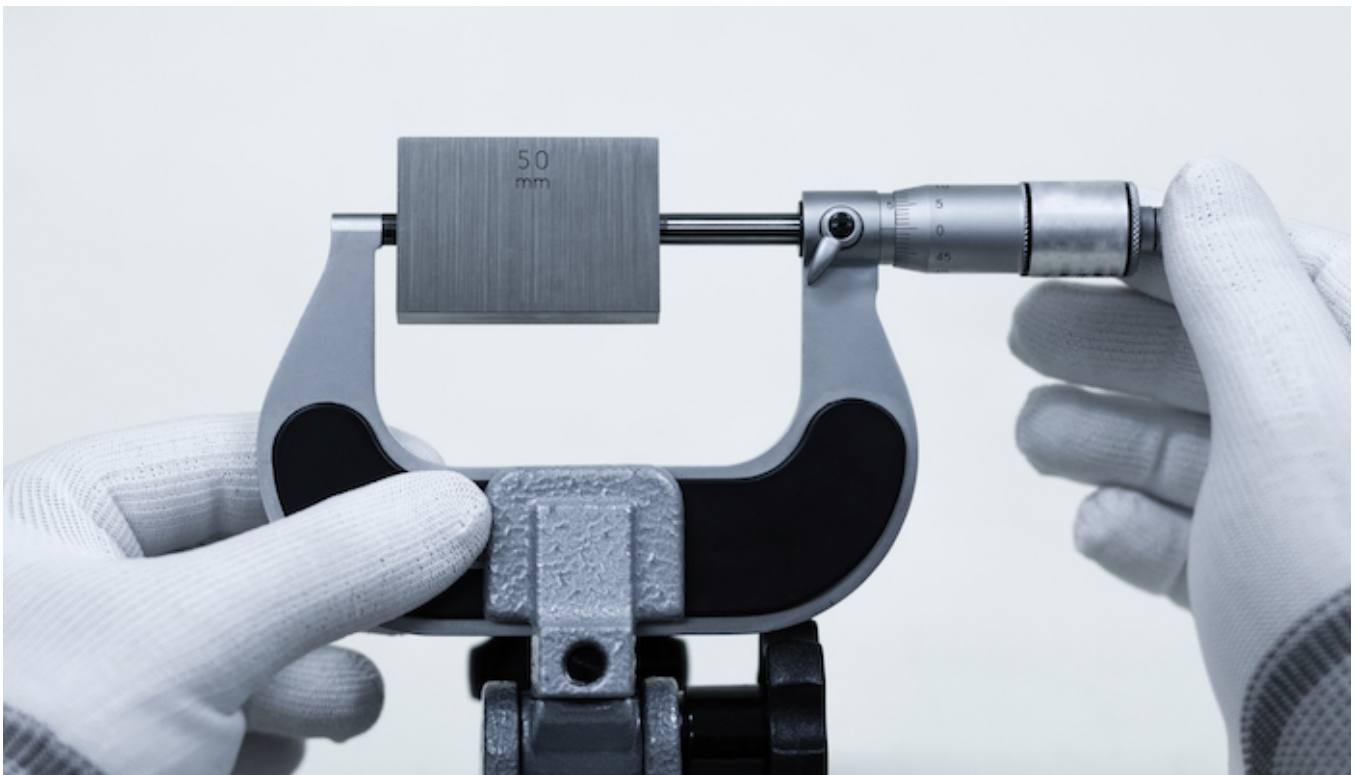
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Introduction

Toyota is often put forward as an exemplar of what to follow — and there is a cottage industry in consulting which often explains what Toyota did inaccurately

Most of the books on Toyota and the Toyota Production System (TPS) were written by consultants, who have consulting services to sell and therefore will often alter the actual history of what set Toyota apart to appeal to executive audiences.



Who Controls Quality?

An important part of the Toyota Production System is that responsibility for quality is distributed across the line employees that do the work. Statistical Process Control (SPC) is typically performed at the end of the process, which was picked up by US authors and popularized to a significant degree by US manufacturers. But there is an important and undiscussed reason why Statistical Process Control received so much emphasis when the Toyota Production System was communicated to the US audience.

The Overstatement of Statistical Process Control as Part of the Toyota Production System

Statistical Process Control was taught to Japanese manufacturers by Edward Deming and others that followed him.

However, the Japanese or Toyota Production System approach **is also to start** with the quality orientation of empowered workers before the final output is produced.

Statistical Process Control is the end of the quality chain. Statistical Process Control is an important part of the Toyota Production System, but Statistical Process Control is in no way the "center" of it. The other factors, far less emphasized by most US consultants, are not any less important than Statistical Process Control.

Also, with hundreds of thousands of professional statisticians living in the US, and with statistics widely taught in the US at the time the Deming was writing his books and consulting, it is confusing why Statistical Process Control was such an enormous revelation.

Statistical Process Control is the review the number of out of specification items as part of a "sample" and then calculate the sample's quality level. Statistical Process Control was designed to determine if this sample which was designed to represent the production population, was high enough or if changes needed to be made to the manufacturing process. This is foundational statistics.



The Labor Input to Quality and Censorship by US Authors on the Toyota Production System

While Statistical Process Control was highly emphasized in books and in consulting to US audiences, specific areas were deemphasized.

These Quality/TPS author/consultants learned to **hide those things from their target audience**, which were critical to implementing the Toyota Production System but may have lead to cognitive dissonance with what the audience would like to have believed. For example, Toyota gave its line production workers the ability to shut down the line if they thought the continuation of production would lead to the quality problem. These workers were both empowered, and they also happened to **be unionized**, and they were well paid.

Then as now, "labor unions" are a dirty word in the US, and it is critical to adjust the message so that nothing is said positively about them.

Authors knew this, and that the executives were not going to want to empower the line workers in any way. Telling US executives the truth would have ben a good way to **not obtain** a consulting deal.

Therefore, this critical aspect of the Toyota Production System was removed or self-

censored from most of the literature on Toyota manufacturing. The original books written by Japanese authors like Taiichi Ohno and books by Edward Deming include important aspects of the Toyota Production System that were removed by later writers. This would be like providing someone with a recipe and leaving **out several of the ingredients**.

Perhaps unsurprisingly, the US manufacturers never attained the same type of benefits that the Japanese manufacturers had achieved from the Toyota Production System and related approaches imported from Asia, even though these programs were expensive investments on the part of US manufacturers. It helped to spawn Six Sigma and all number of quality programs, which also tended to fall short of the originally intended objectives.



Cultural Differences?

The discrepancy was later chalked up to “cultural differences.” Japan was often described as a special place, with a special culture, where some things that worked in Japan could not be exported. This all seemed to make sense, until Toyota began to make cars in the US, and the quality levels attained did not match the lower level of the US manufacturers, but instead matched the quality of the cars that Toyota made in Japan!

At no time was it a point of discussion that perhaps the US consultants that received so many Japanese/Toyota inspired manufacturing improvement projects accurately represented these systems to US manufacturers.

Statistical Quality Control as Trend

One hears far less about Statistical Process Control specifically and statistical quality control generally.

Statistical quality control was so highly studied in the 1980s. Yet soon after the **statistical quality control** trend, where we were told ad nauseum how important statistical quality control was, US companies began outsourcing manufacturing to low-cost countries. Countries like China have all different levels of quality in manufacturing to choose from, as his quote attests.

From my experience with my clients and suppliers I've met in China, I can definitely tell that the importers are also responsible than the suppliers.

Sure, the suppliers can change the raw materials of the products, don't pay attention to the manufacturing process and won't even proceed correctly to a quality check or just skip it and so on.

But at the same time, a lot of importers come to China to produce "cheap" goods and still expect a good quality when they chose suppliers who are pretty famous for the low quality of their goods but they are extremely cheap so yes, they give them their production and surprise! The products won't last more than 2–3 months.

You can produce high quality products in China depending on how you chose your supplier (make an audit for that) and if you make rigorous quality control inspections (at the minimum one). – Sarah Bonaca, Quality Control Advisor in Asia

It goes both way to make a good product.

So many US companies have the choice and chose lower prices rather than quality. It is very well understood that the Chinese items that have replaced US manufactured items are on average considerably lower in quality. This brings up the question as to who serious

This brings up the question as to who serious were about statistical quality control. Within just a few decades US companies moved from being focused on statistical quality control and stating that Six Sigma quality was critical, to accepting far lower quality from overseas manufacturing in order to be "competitive." Strange. Now we can't get companies to agree that overseas workers in manufacturing facilities should not work on slave-like conditions. What a setback for quality in all the dimensions.

Conclusion

Toyota and the Toyota Production System is often cherry-picked by people that want to emphasize an attribute or way of doing something of which they are in favor. And the presentation of the role of Statistical Process Control in the manufacturing success of Toyota is one example of this.

So the next time you hear about how important it is to be flexible in manufacturing, and when Toyota's name is used to support flexible manufacturing as a virtue, you can send that person this article for some more perspective.

References

<https://www.quora.com/Why-are-Chinese-products-of-such-low-quality>



[Superplant: Creating a Nimble Manufacturing Enterprise with Adaptive Planning Software](#)

What is the Superplant Concept?

This book addresses several production and supply planning software functionalities that are all related to the location-based adaptability of the supply chain planning application (multi-plant planning and subcontracting, and contract manufacturing planning).

Solving a Historic Weakness in Production Planning and Scheduling Software

This adaptability is a historical weakness of both advanced planning applications as well as ERP systems. Some of this functionality is rarely found in commercially-available applications, while other functionality is more commonly found but 's hard to implement. This book explains these how these multiple functionalities can be leveraged to provide the ultimate in planning flexibility in both supply and production planning.

Why This Book is Unique

The only book about planning for a "Superplant," by the author who coined the term.

In an environment of increasingly globalized manufacturing, a very long production line that spans the globe is more common than ever. For an increasing number of corporations, multi-plant planning is a reality. "Superplant" describes the ability to plan separate locations as if they were part of one giant plant – or superplant, and is the more accurate modeling of location interdependencies for production and supply planning than is provided by standard advanced planning functionality.

This book delves into the three advanced functionalities that must be enabled for superplant planning: multi-plant planning, subcontracting and multi-source planning. By reading this book you will:

- Investigate how multi-site planning works from a design perspective.
- Learn about the functionality that exists to specifically address multi-plant planning and understand why most supply planning software can do nothing with multiple plants.
- Explore in-depth the PlanetTogether application, which targets the unique planning requirements of a superplant.
- Learn how to set up master data objects to support multi-plant planning functionality.
- Improve Key Performance Indicators (KPIs) through proper deployment of multi-plant planning functionality.
- Examine how subcontracting, and contract manufacturing fit into the superplant concept

This book was written for those with interest in leveraging leading approaches in the supply network for planning improvement. The particular audience would range from executive decision makers to software implementers to supply and production planners.

- Chapter 1: Introduction
- Chapter 2: Understanding a Superplant Conceptually
- Chapter 3: Multi-plant Planning
- Chapter 4: Single Versus Multi-pass Planning
- Chapter 5: Multi-source Planning
- Chapter 6: Subcontracting Planning and Execution
- Chapter 7: Combining All Three Superplant Functionalities
- Chapter 8: The Superplant and the Integration Between ERP and the External Planning System
- Chapter 9: Superplant-enabled Capable-to-promise
- Chapter 10: Conclusion
- Appendix A: Labor Pools in Galaxy APS
- Appendix B: Time Horizons in Galaxy APS
- Appendix C: Prioritizing Internal Demand for Subcomponents over External

Demand

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