

Supply Chain Metrics That Matter: A Focus on Contract Manufacturing

Using Financial Data from Corporate Annual Reports to
Better Understand the Contract Manufacturing Supply Chain

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Research

Supply Chain Metrics That Matter is a series of reports published throughout the year by Supply Chain Insights LLC. The focus of this research is to share insights for supply chain leaders on supply chain performance trends within specific industries. Each report offers a deep focus on a specific industry. This publication focuses on the contract manufacturing industry which supports brand owners in the discrete manufacturing markets of consumer electronics, automotive, medical devices and other industries.

These reports are based on data collected from financial balance sheets and income statements over the period of 2000-2012. In these reports, we analyze how companies made trade-offs over the course of the last decade in balancing growth, profitability, cycles and complexity.

In the practice of Supply Chain Management (SCM), each industry is unique. We believe that it is dangerous to list all industries in a spreadsheet and declare a supply chain leader. Instead, we believe that industry trends need to be tracked and studied over time by peer group. In this series of reports, we analyze the potential of each supply chain peer group, share insights from industry leaders from each industry, and give recommendations based on general market trends.

Disclosure

Your trust is important to us. As such, we are open and transparent about our financial relationships and our research process. This independent research is 100% funded by Supply Chain Insights.

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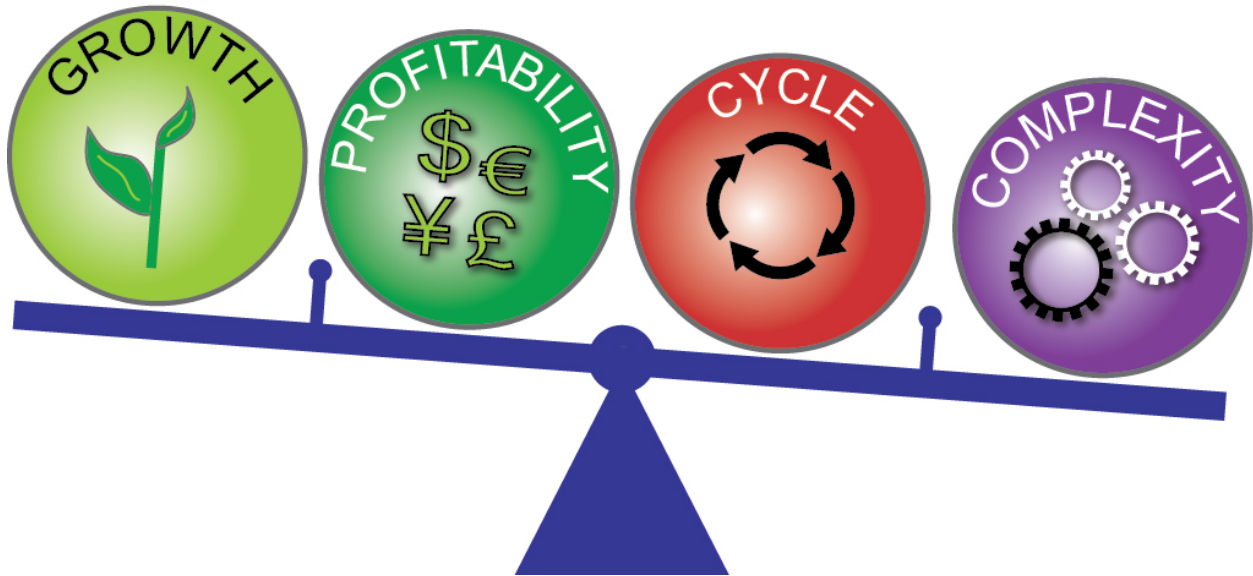
Research Methodology

The basis of this report is publicly available information from corporate annual reports from the period of 2000-2012 for publicly-owned companies involved in contract manufacturing activities.

In picking companies for the *Supply Chain Metrics That Matter* report series, our methodology traditionally focuses on companies recently listed in the Fortune Global 500. For this report, we identified two companies ranked on the Fortune Global 500 for 2013 and augmented them with four hand-selected companies that we believe provide a meaningful comparison to understand the contract manufacturing industry. We used the Morningstar Contract Manufacturers peer group to inform our decision.

In our analysis, we prefer to use financial ratios as opposed to absolute numbers. The use of ratios enables a better comparison of companies of different sizes and across different currencies. We use the financial ratios to gain insights on how the industry is performing on the [Supply Chain Effective Frontier](#). This is a Supply Chain Insights framework for supply chain excellence that evaluates how well companies have balanced priorities of growth, profitability, cycle and complexity over the past decade. We believe that the supply chain is a complex system that must be managed holistically, and each industry has a different potential of performance.

Figure 1. The Supply Chain Effective Frontier



In this report, we use the financial data to help readers learn from past trends and to better understand current operating environments. In addition, we provide recommendations for the future. This financial analysis is augmented with information from our quantitative and qualitative research studies as well as our work with clients operating within the industry.

Executive Overview

Growth is stalled. Margin pressure is high. Shorter life cycles, as well as increasing compliance and regulatory pressure, provide additional challenges to the contract manufacturing industry. Finally, excess capacity is a significant problem. Is this a recipe for opportunity or a disaster for the brand owner using outsourced manufacturing partners? We think the latter.

Over the last decade, brand owners from consumer electronics to medical devices have grown more dependent on outsourced contract manufacturing. In fact, the contract manufacturing industry grew up out of a desire to mitigate risk and improve costs for brand owners. However, the market has shifted significantly in recent years and the contract manufacturing industry is struggling. As a result, they pose a risk to brand owners. In this report, we illustrate how the lack of resiliency affecting contract manufacturers represents a serious risk to brand owners and offer advice on what can be done to mitigate the problem.

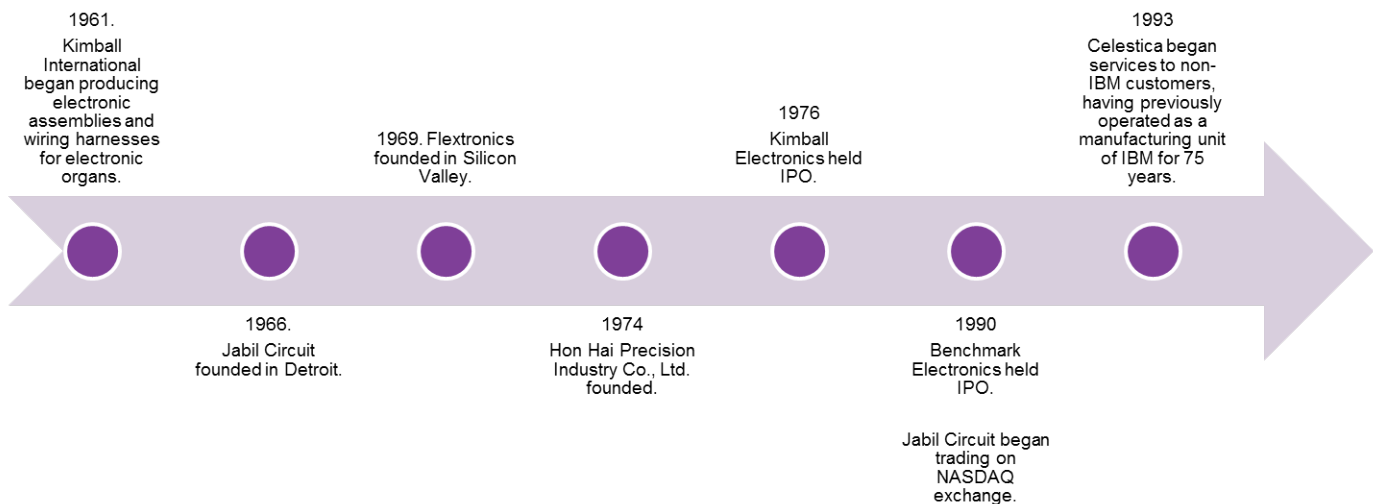
Over the last decade, many contract manufacturers have attempted to differentiate services and refine their business model to gain competitive advantage. However, in looking at the financial results, we find that most companies are struggling. As a result, it is time to redesign the business model and relationships of contract manufacturers and brand owners. While companies can outsource the role of manufacturing, they cannot outsource the responsibility of managing the extended supplier network. This is one of the many challenges the industry now faces.

Contract Manufacturing: Is It the Right Business Model?

Contract manufacturing is now two decades old. Most contract manufacturers began in a different form and have morphed into their current business model. However, today they compete with similar business models in a very competitive landscape. Brand owners are squeezing the contract manufacturers on cost. In contrast, contract manufacturing companies have tried to differentiate based on capabilities, not costs, and the results have been disappointing.

Each company of our peer group entered the industry with very different roots. **Kimball International** initially began producing electronic components for electronic organs made by the company before morphing into a contract manufacturing firm serving external customers. Similarly, **Celestica** operated as a manufacturing unit of **IBM** for 75 years before 1993, when it first began providing manufacturing services to non-IBM customers. The timeline shown in figure 2 illustrates some important dates in the evolution of contract manufacturing.

Figure 2. Timeline of Key Dates in the Evolution of the Contract Manufacturing Business Model



Source: Supply Chain Insights, Corporate Annual Reports

As brand owners distanced themselves from ownership of manufacturing assets, the industry, and relationship between the brand and contract manufacturers, evolved. However, it not yet clear whether the business model is viable long term. Several challenges are outlined by **Celestica** in this excerpt from their 2012 annual report:

“Future growth in our revenue includes a dependence on new outsourcing opportunities in which we assume additional manufacturing and supply chain management responsibilities from OEMs or service providers. Our future growth will be limited to the extent that these opportunities are not available as a result of OEMs or service providers deciding to perform these functions internally or delaying their decision to outsource or our inability to win new contracts. As a result of the weak global economic environment, customers may shift production back to their own facilities to improve their factory utilization.”

- Celestica Inc. 2012 annual report (10K), page 15

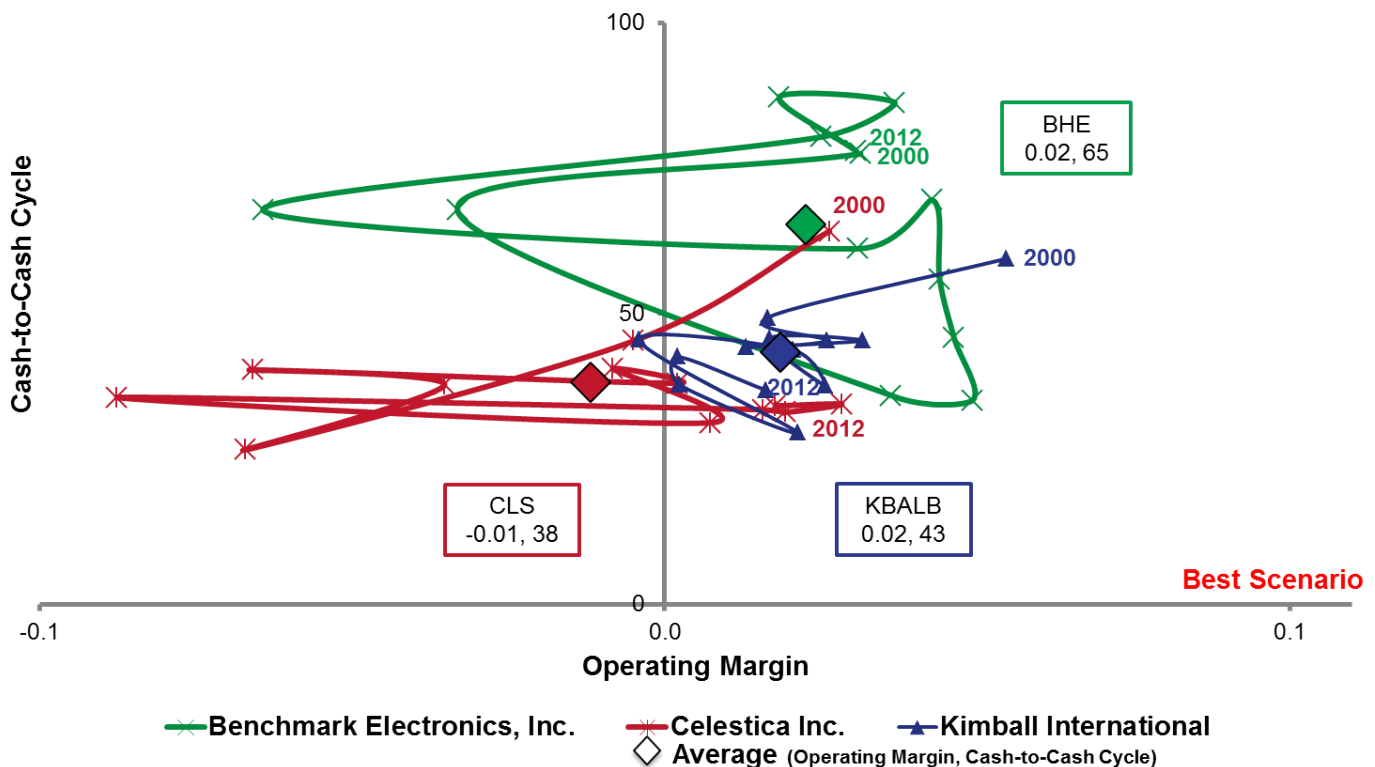
In this report, we aim to highlight business performance on growth, profitability, cycle and complexity measures. We hope to add to the conversation and provide our perspective on the viability of the business model.

The Industry Lacks Resiliency

The first step in the research process for each *Supply Chain Metrics That Matter* report is the creation of graphs plotting the intersection of different trade-offs that supply chain leaders face every day. This two dimensional analysis allows us to identify the patterns of companies' performance on the [Supply Chain Effective Frontier](#).

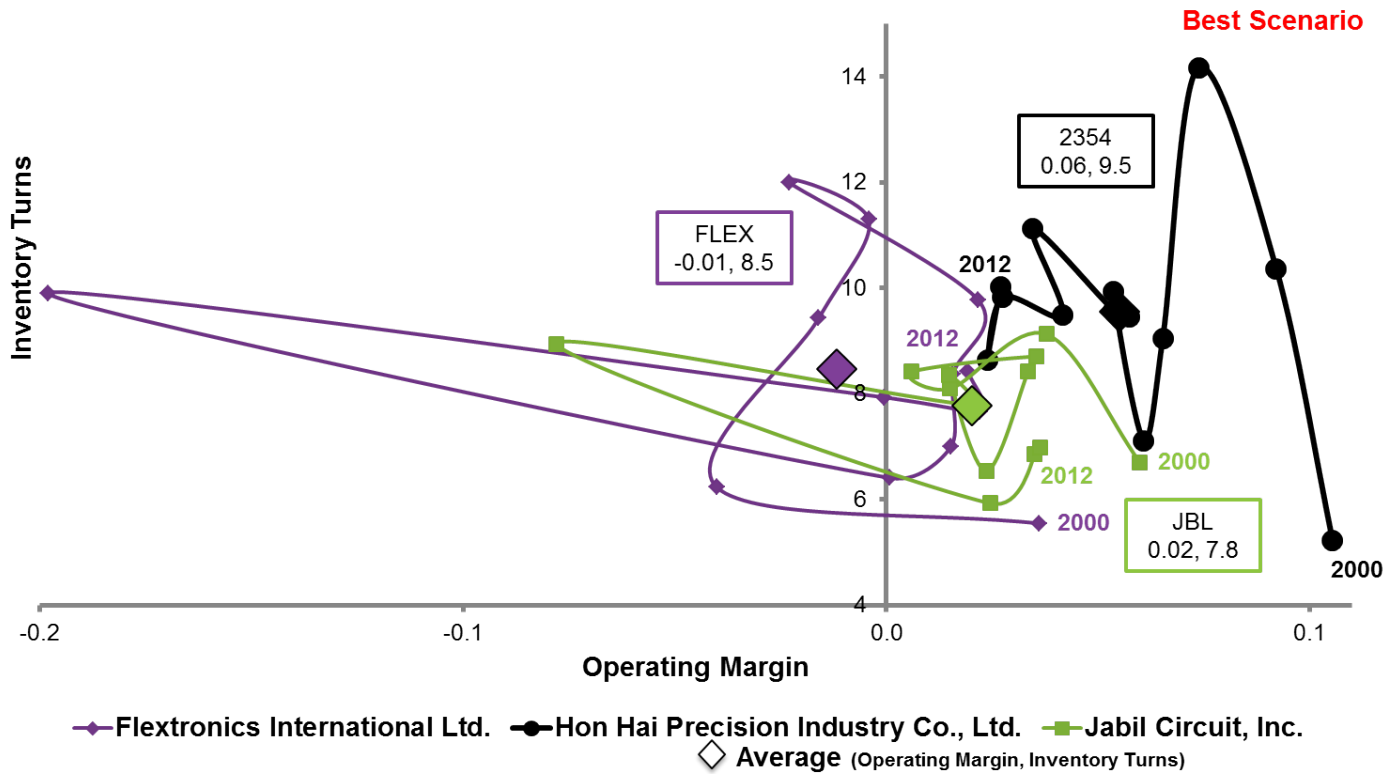
Companies want to grow, increase profitability, reduce cycle time, and improve their ability to manage complexity in operations. The most successful supply chains are able to do so while demonstrating a level of stability and year-over-year improvement in financial results. However, what we see in our analysis of the contract manufacturing industry is something very different. In fact, due to the level of chaos, we have split the peer group into two smaller subsets of three companies each in order for the graphs to be legible and meaningful. On our two dimensional comparison, shown in figures 3 and 4 comparing progress on inventory turns and operating margin, very few, if any, companies demonstrate a sufficient level of stability or resiliency in their results.

Figure 3. Inventory Turns vs. Operating Margin (2000-2012) 1



Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source

Figure 4. Inventory Turns vs. Operating Margin (2000-2012) 2



Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012 from One Source

In this pattern analysis, companies with the highest level of resiliency across the two metrics will display a very tight pattern with small movements on an annual basis. Instead, for the contract manufacturers, we see very large swings in both inventory turns (y axis) and operating margin (x axis) and little evidence of progressive advancement towards the upper right corner maximizing both inventory turns and operating margin.

This lack of resiliency is worrisome. The management of global supply chains will only get more complex in the next decade. This lack of resiliency is not only a problem for contract manufacturers, themselves, but should also concern the brand owners that contract for these services in industries as diverse as medical device and automotive manufacturers, as well as consumer electronics companies. These industries have increased their dependency on contract manufacturing to deliver products on time and on budget. The lack of resiliency demonstrated in the financial results plotted above has the potential to endanger the future success of these downstream companies. However, this lack of resiliency is not a problem that contract manufacturers can solve alone. Instead it requires an industry redesign to improve value for all partners.

Growth: Short-term Volatility

In the face of volatile growth and decreasing demand, the contract manufacturing industry has become increasingly competitive and cutthroat. Annual report excerpts from Celestica and Benchmark Electronics are typical of the industry:

"The EMS industry is highly competitive with multiple global EMS providers competing for the same customers and programs

- Celestica Inc. 2012 annual report (10K), page 34-35

"We experience intense competition, which can intensify further as more companies enter the markets in which we operate, as existing competitors expand capacity and as the industry consolidates. The availability of excess manufacturing capacity at many of our competitors creates intense pricing and competitive pressure on the EMS industry as a whole and Benchmark in particular."

- Benchmark Electronics, Inc. 2012 annual report (10K), page 13-14

As a result of this competition, growth by capturing and retaining market share is critical for success among contract manufacturers. The year-over-year sales growth for the companies profiled in this report is presented in table 1.

Table 1. Year-over-Year Sales Growth (2000-2012)

Year-over-Year Sales Growth (2000-2012)					
Company	Average	2000-2003	2004-2007	2008-2011	2012
Benchmark Electronics, Inc.	4%	N/A	13%	-5%	10%
Celestica Inc.	-2%	N/A	6%	-2%	-10%
Flextronics International Ltd.	10%	N/A	9%	14%	3%
Hon Hai Precision Industry Co., Ltd.	39%	N/A	46%	25%	12%
Jabil Circuit, Inc.	15%	N/A	27%	8%	4%
Kimball International	-0.2%	N/A	4%	-1%	-5%
AVERAGE	12%	N/A	18%	6%	2%

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012

Note the level of volatility seen here is not present to the these extremes in any other industry we have studied in this series. Hon Hai Precision Industry Co., Ltd., better known as FoxConn, demonstrates double-digit levels

of growth throughout the period, but falls from a high of 46% from 2004-2007 to a low of 12% in 2012. The impact of the Great Recession, that became international in September, 2008, was extreme on the industry with several companies demonstrating negative growth levels during the period that followed.

There are many root issues. In general, contract manufacturers operate on short-term contracts, always competing to get the next piece of work. This creates instability within the industry. Celestica explains the issue in their 2012 annual report excerpt.

“Although the industry is characterized by a large revenue base and new business opportunities, the revenue is volatile on a quarterly basis, the business environment is highly competitive, and aggressive pricing is a common business dynamic.”

- Celestica Inc. 2012 annual report (10K), page 34-35

In addition, most contract manufacturers have a small list of clients who are responsible for a large percentage of their sales. As outlined below, the loss of a single client, when they account for a large percentage of revenue, could be disastrous to the company.

“Sales to our ten largest customers represented 56%, 53% and 47% of our sales in 2012, 2011 and 2010, respectively. In 2012, sales to International Business Machines Corporation represented 21% of our sales. The loss of a major customer, if not replaced, would adversely affect us.”

- Benchmark Electronics, Inc. 2012 annual report (10K), page 7

The situation described by Benchmark Electronics is not unusual and some companies dedicate even more of their sales to the top customers. Celestica, for example, received 67% of total revenue from their top 10 customers in 2012. The combination of short-term contract work with a concentrated list of clients creates a challenging environment for stable growth.

Profitability: Squeezing the Margins

Similarly, operating margin is a critical issue and especially so for contract manufacturers. In the outsourced environment in which they operate, margin is often tight and unfortunately, getting even tighter. To illustrate this trend, examine the results for the time period 2000-2012 as presented in table 2.

Table 2. Operating Margin (2000-2012)

Operating Margin (2000-2012)					
Company	Average	2000-2003	2004-2007	2008-2011	2012
Benchmark Electronics, Inc.	0.02	0.02	0.04	0.00	0.03
Celestica Inc.	-0.01	-0.02	-0.02	-0.01	0.02
Flextronics International Ltd.	-0.01	-0.01	0.01	-0.04	0.02
Hon Hai Precision Industry Co., Ltd.	0.06	0.08	0.06	0.03	0.03
Jabil Circuit, Inc.	0.02	0.03	0.03	0.00	0.04
Kimball International	0.02	0.03	0.02	0.01	0.02
AVERAGE	0.02	0.02	0.02	0.00	0.02

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012

Two of the six companies demonstrate an average operating margin over the 13 years that is negative; and the highest average operating margin, reported by **FoxConn**, is only 0.06. Compare this to the margin levels seen by the brand owners, especially those companies operating in the consumer electronics industry displayed in table 3.

Table 3. Operating Margin (2000-2011)

Consumer Electronics Operating Margin (2000-2011)				
Company	Average	2000-2003	2004-2007	2008-2011
Apple Inc.	0.12	0.00	0.12	0.25
Dell Inc.	0.07	0.08	0.08	0.05
LG Electronics	0.05	0.05	0.04	0.06
Motorola Inc.	0.02	-0.04	0.08	0.01
Research in Motion Ltd.	0.08	-0.15	0.14	0.25
Samsung Electronics Co., Ltd.	0.11	0.14	0.11	0.07

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2011

Contract manufacturing companies will continue to struggle until there is more stability in volume and operating margin. Emerging consumer patterns pose further challenges to operating margin. There is an ongoing shift in products from larger desktops and laptops to smaller mobile devices including tablets and smart phones. The result is a reduction in volume, leading to excess capacity and increased competition for contracts. **Kimball International** addresses this situation in their recent annual report:

“The segment continues to experience margin pressures related to an overall excess capacity position in the electronics subcontracting services market. The continuing success of this segment is dependent upon its ability to replace expiring customers/programs with new customers/programs.”

- Kimball International 2012 annual report (10K), page 4

Cycle: Who Is Responsible?

Cycle metrics, including the cash-to-cash cycle and days of inventory, are the most common metrics used to gauge a supply chain’s progress. However, in our ongoing research presented in monthly *Supply Chain Metrics That Matter* reports, we find that few industries have made significant progress in managing inventories. While there is no progress demonstrated by the contract manufacturing companies profiled in this report; in the face of increasing volatility, the industry should pride itself on the fact that there has not been a substantial increase in inventory. The results for days of inventory performance are displayed in table 4.

Table 4. Days of Inventory (2000-2012)

Days of Inventory (2000-2012)					
Company	Average	2000-2003	2004-2007	2008-2011	2012
Benchmark Electronics, Inc.	58	62	55	60	52
Celestica Inc.	48	54	46	46	45
Flextronics International Ltd.	45	49	41	47	43
Hon Hai Precision Industry Co., Ltd.	41	44	41	38	36
Jabil Circuit, Inc.	48	46	46	51	52
Kimball International	46	42	44	52	46
AVERAGE	48	49	46	49	46

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012

If we examine the industry averages over the period, we can see that over a period of 13 years, three days' worth of inventory was reduced from contract manufacturers' supply chains.

Brand owners have outsourced not only the manufacturing, but also inventory management to contract manufacturers. The lack of a single person with end-to-end ownership of the supply chain makes it tough to tackle this situation. This led to stagnation in inventory management for contract manufacturers as displayed in table 4.

Complexity: Declining Productivity

Increasing complexity is a fact of life for this value chain. To offset costs, contract manufacturers have lengthened the supply chain to take advantage of lower labor costs in emerging economies with less developed infrastructure. The ongoing search for lower cost labor and manufacturing locations has created an industry with constantly shifting supply chains. This trend is directly referenced in the following excerpt from

Benchmark Electronics:

"We may also be at a competitive disadvantage with respect to price when compared to manufacturers with lower cost structures, particularly those with more offshore facilities located where labor and other costs are lower."

- Benchmark Electronics, Inc. 2012 annual report (10K), page 13-14

Table 5. Revenue per Employee (2000-2012)

Revenue per Employee (K\$) (2000-2012)					
Company	Average	2000-2003	2004-2007	2008-2011	2012
Benchmark Electronics, Inc.	256	N/A	273	231	248
Celestica Inc.	198	N/A	194	201	224
Flextronics International Ltd.	166	N/A	166	168	185
Hon Hai Precision Industry Co., Ltd.	113	N/A	109	115	102
Jabil Circuit, Inc.	184	N/A	178	209	122
Kimball International	164	N/A	150	189	181
AVERAGE	181	N/A	179	185	177

Source: Supply Chain Insights LLC, Corporate Annual Reports 2000-2012

All companies are struggling to improve productivity. While brand owners in several industries (especially consumer electronics and medical devices) have improved revenue per employee, contract manufacturers have not. The data for the peer group is presented in table 5.

The industry as a whole has actually seen a decrease in revenue per employee from the 2000-2003 period to today. Individual companies have each had their own experience, but ultimately the revenue per employee numbers for contract manufacturers remain stuck in the \$100,000-\$200,000 range.

In comparison, in the semiconductor industry with the move to fabless companies, companies have seen climbing revenue per employee. **Taiwan Semiconductor Manufacturing Co., Ltd.**, one of the largest companies by market capitalization in the Morningstar Semiconductor peer group as of July 25, 2013, saw increasing revenue per employee over the past decade from \$347,000 in 2002 to \$436,000 in 2012. **Intel Corporation**, a company which owns its own fabs, but also outsources some of the manufacturing, saw an increase in revenue per employee of \$169,000 (from \$340,000 to \$590,000) from 2002 to 2012. If semiconductor companies have been able to do it, why have contract manufacturers faltered?

Recommendations

We believe it comes full circle. Brand owners have outsourced manufacturing in an attempt to reduce costs and improve reliability; however the lack of industry stability in contract manufacturing now poses a serious threat. We recommend five action steps for concerned brand owners.




- **Invest in building a more viable supplier network.** Recognize the issues surrounding suppliers and work in supplier development efforts to right the ship. This effort should include all suppliers, not just contract manufacturers.
- **In the face of increasing compliance legislation, redesign the supply chain to be more sustainable.** Use this as a compelling business platform to work to stabilize the industry business model.
- **Own the demand signal.** Work with technology providers like **Kinaxis** and **E2Open** to improve data sharing and network visibility to reduce data latency, and improve responsiveness, while reducing waste in the supply chain.
- **Evaluate cost-to-serve and work on being a better partner.** Attempt to reduce all forms of waste between the outsourced manufacturer and the brand owner.
- **Begin contingency planning for the worst-case scenario.** Evaluate suppliers on the basis of risk, and plan to mitigate risk through in-house manufacturing and redesign of the network.

Conclusion

The contract manufacturing business model evolved over several decades into its current form. What began as a brilliant business model now needs to be questioned and reexamined for viability. With decreasing volume, increasing instability, and the ongoing variability in demand and supply, the contract manufacturing model may now pose greater risk than opportunity for brand owners. Tread carefully.

Appendix

Company Profiles

Company	Stock Exchange: Ticker Symbol	2012 Revenue (billions USD)	2012 Global Employees (thousands)	Country Where Based
 Benchmark Electronics, Inc.	NYSE: BHE	2.5	9.9	USA (Texas)
 Celestica Inc.	NYSE: CLS	6.5	29.0	Canada (Ontario)
 Flextronics International Ltd.	NASDAQ: FLEX	29.4	159.0	Singapore
 Hon Hai Precision Industry Co., Ltd.	TPE: 2354	132.0	1,290.0	Taiwan
 Jabil Circuit, Inc.	NYSE: JBL	17.2	141.0	USA (Florida)
 Kimball International	NASDAQ: KBALB	1.1	6.3	USA (Indiana)

Source: Supply Chain Insights LLC, Corporate Annual Reports 2012 from One Source

Other Reports in This Series:

[Supply Chain Metrics That Matter: A Focus on Retail](#)

Published by Supply Chain Insights in August 2012.

[Supply Chain Metrics That Matter: A Focus on Consumer Products](#)

Published by Supply Chain Insights in September 2012.

[Supply Chain Metrics That Matter: A Focus on the Chemical Industry](#)

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About Supply Chain Insights LLC

Founded in February, 2012 by Lora Cecere, [Supply Chain Insights LLC](#) is focused on delivering **independent, actionable and objective advice for supply chain leaders**. If you need to know which practices and technologies make the biggest difference to corporate performance, turn to us. We are a company dedicated to this research. We help you understand supply chain trends, evolving technologies and which metrics matter.

About Abby Mayer



Abby Mayer (twitter ID [@indexgirl](#)), Research Associate, is one of the original members of the [Supply Chain Insights LLC](#) team. She is also the author of the newly-founded blog, [Supply Chain Index](#). Her supply chain interests include connecting financial performance and supply chain excellence, as well as talent management issues and emerging markets.

Abby has a B.A. in International Politics and Economics from Middlebury College and a M.S. in International Supply Chain Management from Plymouth University in the United Kingdom. She has also completed a thru-hike of Vermont's 280 mile Long Trail, the oldest long distance hiking trail in the United States. As part of the planning and food prep process, she became interested in supply chain management when she was asked to predict hunger pangs for the entire three-week trip before departure. If that isn't advanced demand planning, what is?!?!