

Supply Chain Optimization with an Element of Risk-Sharing and Humanity:
A Balanced Governance Model of and across a Supply Chain

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ABSTRACT

Supply chain spans through countries, regulations, atmospheres; and incidences occur from time to time. Previous ones incidences occurred in sporting goods companies; current ones incurred in OEM companies. We draw analogies on some key incidences for the past and for the present.

Recent incidence suggests that significant risk was transferred from some manufacturing companies of blockbuster products (e.g., iPad) to its OEMs or assembly companies.

We believe that the zero-inventory practice in modern supply chain is an optimization result from cost-minimization. The zero-inventory model works well in the case of commodity product with foreseeable demand. However, when the product is expected to receive great yet unknown demand from market, the manufacturing company should consider a different model—optimization with an element of risk-sharing and humanity.

We believe that the distribution of surplus among all parties in the supply chain should be adjusted flexibly on the received success from the market. For example, if the product outsold the expected quantity, and overwhelming demand can only be met with sudden and bulk order with the OEM or assembly companies, then more bonuses should be distributed to the front-line workers instead of just extending their work hours with minimized or fixed overtime wages. The assembly line workers in the OEM firm actually took the risk (of lost sales) from the manufacturing company of the blockbuster product and should be adequately rewarded for their significant contribution.

We think modern supply chain has to take into account of not only the cost minimization (or profit maximization) for a manufacturing company, its executives and investors. An element of humanity should be provided to the workers who actually are anonymous heroes who helped manufacturers “print cash”, and helped executives and investors gain lucrative profits.

We like, in particular the Starbucks fair trade practices with coffee farmers in Brazil and we like to introduce it to modern supply chains, especially the ones with blockbuster product and with sudden and bulk fulfillment orders sent to OEM firms. We also studied how a sporting goods giant Nike had faced and finally dropped itself from the “sweat” labeling some fifteen years ago.

Our research objective is to find a balanced governance model of and across a supply chain to take adequate care of all stakeholders in the chain: executives, investors and employees of each respective company. Research method is case study; and three suggestions of fairly allocate marginal surplus to over-time workers are provided. Potential achievements with similar efforts include helping OEM manufacturers obtaining fair and flexible pricing via persuasive negotiation with evidence on timely delivery and perceived quality; redefining governance, responsibility and compensation structures of and across a supply chain; promoting fair and sustainable value-adding processes.

INTRODUCTION

Foxconn has been on the international media recently. On one side, the company is acclaimed the most successful in its capabilities of delivering OEM products with good quality and timeliness, even with bulk orders under short notice. On the other side, the company is considered not capable enough in dealing with the workers' occupational boredom and stress from long hours of assembly work.

"With 800,000 workers in China alone and contracts to supply Apple, Dell and H.P., Foxconn is an electronics goliath that also sources supplies, designs parts and uses its enormous size and military-style efficiency to assemble and speed a wide range of products to market. They're like Wal-Mart stores," Professor Dedrick said. "They're low-margin, high-volume. They survive by being efficient." No company does more of it than Foxconn, a division of the Hon Hai Group of Taiwan, the world's largest contract electronics manufacturer. [4]

In terms of efficiency and zero inventory supply chain capabilities, Foxconn is probably not second to Toyota.

The Foxconn is especially capable of handling sudden and bulk orders with non-comprised quality, most suitable in the era of lean and mean manufacturing, or no inventory manufacturing. Apple's market share was increased from less than five percent to beyond twenty-five percent in the past decade and the secret of success lies in its capabilities of great product design and good OEM strategy, which was in a significant portion crafted with Foxconn. "Steve Jobs' achievements wouldn't be possible without Terry," says Chang Tien-wen, author of the 2005 book *The Tiger and The Fox: Terry Gou's Global Competitive Strategy*.

To elaborate, "As he squeezes costs throughout his empire, Gou also takes huge risks on behalf of his major clients. In Chongqing, in central China, Foxconn is spending \$1 billion on a factory that will produce 30 million machines a year just for Hewlett-Packard. When Apple's iPhone4 was nearing production, Foxconn and Apple discovered that the metal frame was so specialized that it could be made only by an expensive, low-volume machine usually reserved for prototypes. Apple's designers wouldn't budge on their specs, so Gou ordered more than 1,000 of the \$20,000 machines from Tokyo-based Fanuc. Most companies have just one. "Terry is a strong leader with a passion for excellence," says Tim Cook, Apple's chief operating officer. "He's a trusted partner and we are fortunate to work with him." The Longhua plant now produces 137,000 iPhones a day, or about 90 a minute." [3]

For management staff, Foxconn may be very generous, as evidenced by the end-of-year celebration and lottery drawing for sharing the achieved financial success of the company. It didn't seem to shorten the great gap of perceived fairness between the high-paying staff and low-paying workers within the same company and across borders of the very supply chain.

Regarding Foxconn's indispensable contribution to Apple's extremely high profit margin and drastically increased output capacity, we found:

"The total bill of materials on a \$600 iPhone -- the supplies that go into final assembly -- is \$187.51, according to iSuppli. The least expensive part of the process is manufacturing and assembly. And that often takes place here in southern China, where workers are paid less than a dollar an hour to solder, assemble and package products for the world's best-known brands." [4]

And, "Foxconn's business has evolved to the point where it's not just relying on cheap, unskilled labor. It now employs 50,000 toolmakers, including a team of 2,000 plus workers who focus on the design and fabrication of molds and dies. This enables the company to boost production faster than anyone else, especially important in the handset market where new models are constantly introduced. "If you want to look under the hood at Foxconn and understand why they have a high market share, it's because of these things," says Jason Dedrick." [3]

Out of Foxconn's total of 920,000 hires in China, we have estimated that 80 percent are on the wage-based salary and are of common skills set, or assembly-line workers. It's exactly those workers, who are equipped with low skills set, will end up with low wages and boring assembly tasks. Over time problems gradually developed.

The company's capability mainly comes from the work discipline enforced through the onsite training and slogans widely seen at the work place. However, workers are not soldiers even when the discipline enforced are close to the military standard. Tragedies happened and reoccurred and more than ten young lives were lost in less in a year of time. Whatever the underlying reason is, this terrible setback of the company had alarmed the management staff and the local government to examine the over-pressured workplace.

Concerns of workers' rights overwhelmed the company after the death of ten young workers, "Foxconn, the world's leading electronics manufacturer and one of Apple's major suppliers, has been linked to 10 worker suicides at one of its Chinese plants this year alone. Deplorable labour practices, including extremely low wages, excessive overtime, extreme productivity targets and a particularly harsh and isolating management system, contribute to an oppressive working environment." [8]

A deep concern is centered on the weird combination of the low base wage and high productivity target. Analysts found that workers had little to earn in terms of wages, or to expect for in terms of promotion or career advancement. The combination of low wages and high productivity should never have been one of the very reasons why Foxconn investors had earned high returns from investing in the shares.

In order to find a solution for Foxconn and her assembly line workers, we now draw an analogy from best practices found at Starbucks and its Brazilian coffee farmers.

FOUR POSSIBLE WAYS TO FAIRLY ALLOCATE SURPLUS TO OVER-TIME WORKERS

One method is the level-based distribution of surplus. If the gross revenue is increased by X percent due to the bulk and sudden orders, and the over-time cost counts x percent in the cost structure, then allot x percent of the X percent increase in gross profit (revenue minus bill of materials) to reward the over-time effort. The rationale behind this allocation lies in its simplicity: the over-time weight in the cost structure (i.e., x percent of the overall cost) is compensated by the x percent of total gross profit increase, i.e., $X\%$ [Original Gross Profit]. This captures the essence of the "matching" concept in Generally Accepted Accounting Principles (GAAP). The overtime worker will receive an additional level compensation increase of $x\%$ [Gross Profit Increase], or $x\% \cdot X\%$ [Original Gross Profit].

The second method is the slope-based distribution of surplus. If the gross profit (revenue minus bill of materials) increases Y percent due to the blockbuster success; and the overtime usage increases y percent due to the increased demand of over-time labor, then increase payment to overtime workers by y' percent, an increasing function of both y and Y , the percent increase in gross profit. The rationale resides in the fact that over-time pay increase should be in commensurate with the marginal contribution made by over-time in enhancing the gross profit. Under this scheme, the growth rate of overtime compensation is a function of both the growth rate of demand of overtime labor (y), and the percent increase in gross profit (Y). And the allocation of percentage profit increase is proportionate to its ever increasing dependence on overtime labor, or percentage increase of demand of overtime labor. Note that the additional compensation made to overtime worker is significant in this case since y' is an increasing function of both y and Y , the percentage increase in gross profit.

The third method is to convert the variable-cost approach to longer-term hiring approach. Hiring over-time labor is taking advantage of the workers by hiring fewer full-time workers and paying lower fixed labor cost. If the sudden and bulk order is frequent, as often seen in the blockbuster success in consumer electronics, notebook, and cellular phone products, OEM companies should consider converting overtime to the long-term normal hiring and calculate the cost difference; and distribute such cost-

savings back to the incumbent over-time labor force. This reflects the fact that “a penny saved is a penny earned,” which justifies the allocation of positive cash flow to key contributors.

The fourth method is to increase the wages in proportion to the local living expenses growth rate (covering both the local inflation and local economic growth rate) to maintain the adequate quality of life. This is essential if the company do not want to migrate like a shepherd, constantly chasing after low-cost labor.

The additional compensation for over-time, as calculated from one of the above four methods can be allocated in one or a combination of the following ways: money for pay increase, expenditure for job enrichment, scholarship for additional job training or learning opportunities, birthday gift money for the young or elderly in the worker’s family, funds for hiring more long-term worker to lessen incumbent’s pressure, or contributions to savings for workers’ future or retirement needs. We believe that the money should be spent on either working/living condition improvement or hope building.

Apple can certainly cope with the proposed labor cost increase (better than most other companies) because it has fat profit margins of as much as 60 percent, and adequate pricing power.

Stanford University’s Management Science and Engineering Department hosts an excellent group of preeminent researchers in its Work, Technology and Organizations (WTO) consortium. They will be able to help OEM companies develop a model which strikes a delicate balance between efficiency and morale in a modern setting of technology and the workplace.

The Sixth Force (the complement-or) in Porter’s Five Forces Model: Free Trade Agreement and Starbucks

Where does Starbucks’ leeway of paying higher and fairer prices for coffee beans come from? One of the main reasons that Starbucks was able to implement the fair trade philosophy while maintaining its competitiveness may be due to the help from Free Trade Agreement between the North America and the central and south America. Since the tariff was removed, Starbucks was gaining an advantage of some twenty percent leeway or additional competitiveness in sourcing the beans from the central and south Americas. Starbucks transferred the savings or gains to the stakeholders along the supply chain, including the Brazilian coffee farmers who were close to the poverty line.

Foxconn has thought about the much wanted sixth force (often known as the complementor) but it has yet to be launched and strengthened. According to what the company had announced, the plan of launching 10,000 consumer electronics retail storefronts will start when the manufacturing bases are successfully moved to the central China where labor cost is still low, and matching incentives from the local government are attractive. We think Foxconn is realizing its belief that China is not only its manufacturing base but also future markets. If the plan succeeds, Foxconn might have secured the Sixth Force. Current labor force will see opportunities and hope of working in retail stores in the future if they will have contributed with great effort in current assembly line work.

Organization Slacks and Hope Building

Organization slack is probably the most important slack by design in any organization, especially in the labor-intensive OEM firms. Yet it is often ignored by the management staff due to the razor-thin profit margin, and the pressure from the short lead time, which in turn comes from the blockbuster success of the merchandise and the accompanying bulk and sudden orders. The OEM system undergoes a high risk of overburdening with little or no slack while the surplus is disproportionately distributed along the

supply chain. The workers often obtain little additional compensation while having to share the most amount of stress and boredom of the overtime schedule of the assembly tasks.

Foxconn's plan of entering the consumer electronics retail storefronts may create up to 100,000 managerial jobs (assuming 10 jobs at each of the 10,000 storefronts) for its assembly line workers who have worked long enough for the company. This is indeed successful hope building.

CONCLUSION

Foxconn had faced a problem which many companies had faced in the era of globalization and supply chain, i.e., the publicity issue. It will help if Foxconn may spell out the metrics of social responsibilities of the company.

It goes without saying that, in the past decade, Foxconn had made great contribution in creating jobs for workers with little or no training. The cities which have hosted Foxconn factories have also seen great infrastructure enrichment and tax revenue increase. Money flows in to where Foxconn is. However, the time has evolved and paradigm has shifted. The living expenses in the host cities have increased greatly and had belittled the once envied salary at Foxconn. And while Foxconn grows fast, the rate of salary increase has probably fallen behind the local economic growth rate, let alone the inflation rate. Especially in such situation, the problem of fairer surplus distribution becomes even more crucial.

Fair distribution of surplus in a supply chain is essential for the chain to be sustainable. As Chinese slang puts it "It's okay that we have little altogether, but it's not okay if the allocation of surplus is done without much perceived fairness."

Distribution of surplus can be done in one of the following forms: job enrichment, higher base salary, reasonable overtime salary, advancement in career, etc.

Workers' perception of being valued is by comparison. Seeing management staff being rewarded with high salary and gift drawing in year-end celebration party, investors getting great returns, workers may well not honored of their hard work. Beyond that, wage growth rate is barely enough to cover the high growth rates of living expenses in the prosperous local cities. Workers may ask themselves: "Why my company looks so rich yet I feel so poor?" Such a feeling may cause workers to feel not contributing or not so useful to the company. Besides, "All work and no play make Jack a dull boy" is a vivid description of the assembly line workers' occupational boredom. After all, first line workers and their morale are critically essential to the success of any OEM company. Foxconn may, for example, ask the front-line workers the gift they want to give to their Parents on birthdays and help them deliver the little wishes.

In the modern supply chain optimization, labor costs are taken as inputs and shouldn't be depressed. According to the estimates from a Penn State scholar, the assembly cost for an iPad is US\$11.20 or a bare 2.2% of a US\$499 iPad. And the 2.2% is paid to the owner of OEM company to cover all types of costs, including the regular and over-time labor cost. We have reasons to believe that the final labor cost paid is just a bare 25% of the 2.2% of the sale price of an iPad.

We attempted to help OEM company set their cost for assembly workers from the example of Starbucks and their contracted Brazilian coffee farmers. We believe that an analogy may be drawn between the two and we had provided four possible ways to allocate the marginal surplus from the blockbuster success to the underpaid assembly line workers. We strongly do not believe that OEM companies should underbid each other to the degree to depress the front-line workers' wages. A lower bound of each type of task should be set by a disinterested consortium.

We also studied how a famous sporting goods company solved the publicity issue on underpaid labors. However, the sporting goods company owns its own brand and has full capacity of increasing the prices of the sporting goods to increase the wages. Foxconn, on the other hand, faces underbid pressure from other capable OEM companies and cannot just increase the sales prices of the finished products.

Let's remind readers of the company's labor-intensive assembly line work, and the never-stopped searching for new sources of low-cost labor:

"It takes 3,000 procedures to assemble an H.P. computer," says Isaac Wang, an iSuppli analyst based in China. "If a contract manufacturer can find a way to save 10 percent of the procedures, then it gets a real good deal."

Contract manufacturers like Foxconn are now searching for ways to reduce costs. Foxconn is considering moving inland, where wages are 20 to 30 percent lower. The company is also spending heavily on manufacturing many of the parts, molds and metals that are used in computers and handsets, even trying to find larger and cheaper sources of raw material. [4]

Some analysts have provided their view on Foxconn's business sustainability:

"We've concluded Foxconn's labor-intensive model is not sustainable," says Mr. Wang at iSuppli Research. "Though it can keep hiring 800,000 to one million workers, the problem is these workers can't keep working like screws in an inhuman system." [4]

Indeed, Foxconn and other OEM companies have had several great decades and it's time to think what to do next: migrating to inland is only a temporary solution since in another good ten years the economy development in today's inland will again warrant higher wages for workers. The sustainability issue will continue to be dressed and cast a shadow to the company's going concern. Foxconn will have to enter a new industry (e.g., greener technology, solar battery) which embraces its manufacturing strength and allowing higher profit margin. However, in the long run, "the value goes to where the knowledge is".

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