

# ENGAGING THE SUPPLIER FOR SUPPLY CHAIN SUSTAINABILITY WITH COMMITMENT TO CONTRACT TERMS AND AUDITING

*Hossein Rikhtehgar Berenji, College of Business, Pacific University, Forest Grove, OR, 97116  
503-352-3086, hossein@pacificu.edu*

*Nagesh N. Murthy, Lundquist College of Business, University of Oregon, Eugene, OR, 97403  
541-346-5137, nmurthy@uoregon.edu*

*Zhibin (Ben) Yang, Lundquist College of Business, University of Oregon, Eugene, OR, 97403  
541-346-3308, zyang@uoregon.edu*

## ABSTRACT

We model a supply chain in which the buyer audits the supplier's compliance with the code of conduct. We investigate the effect of buyer's upfront commitment to price and quantity on supplier's compliance. We also analyze implications of raising the standard of code of conduct on sustainability and financial performance.

**Keywords:** Supplier's Social and Environmental Compliance, Sustainability Code of Conduct, Commitment to Contract Terms, and Game Theory.

## INTRODUCTION

Major brands in many industries outsource their production and hence lose direct control in managing sustainability in their supplier base. An overwhelming majority (i.e., as much as 70%) of sustainability issues (i.e., social and environmental violations) come from suppliers [1]. Brands strive to reduce the likelihood of social and environmental violations in their supplier base. Many brands such as Nike, GAP, Wal-Mart and Apple have developed a code of conduct that sets expectations for their suppliers' social and environmental practices. These brands audit their suppliers' compliance [2].

Yet suppliers' likelihood of compliance varies significantly across industries with significant consequences for the buyer. For example, a supplier of multiple fashion brands (i.e., GAP, Old Navy, and Banana Republic), released untreated wastewater into local streams and rivers in China that resulted in significant brand damage [3] [4]. In another incident, a supplier of Nike employed child labor and paid low wages. Consequently, the customers organized boycotts, which resulted in loss of revenue for Nike [5].

Brands face the challenge of engaging the supplier for improving social and environmental sustainability. Previous researches have investigated the efficacy of using various tools such as offering price premium (see [6]), auditing (see [7]), and certification (see [8]) to motivate suppliers to be more socially and environmentally responsible. We investigate the efficacy of a brands' use of commitment to contract terms in combination with auditing (i.e., committing to price and/or quantity prior to auditing) to enhance supplier's compliance to the code of conduct. We address the following research questions:

- 1) How does commitment affect the compliance to the code of conduct?
- 2) How does commitment affect the financial performance of buyer and supplier?

- 3) What is the relative value of different modes of commitment (i.e., price only, quantity only, or both, or neither)?
- 4) What are the implications of raising the standard of code of conduct on sustainability and financial performance?

## MODEL

We develop and analyze multistage game-theoretic models. We consider a supply chain with a buyer and a supplier. The buyer sources a product from the supplier with a wholesale price contract and sells the product to the market. The supplier may misbehave socially or environmentally and cause the buyer to lose market revenue. The buyer audits the supplier with respect to the code of conduct. The supplier exerts an effort to comply with the code of conduct. To induce higher level of effort of the supplier, the buyer may commit to some or all the contract terms (i.e., price, quantity) before auditing.

## RESULTS AND IMPLICATIONS:

We solve for the subgame-perfect equilibrium and characterize the contract terms, the buyer's auditing effort, and the supplier's compliance effort at the equilibrium. We also derive the overall compliance of the supply chain and the two parties' profits. To the first research question, our results confirm that increasing the level of commitment improves the supplier's compliance. Partial commitment to the price may decrease the overall compliance of the supply chain in comparison to the scenario of no commitment. To the second research question, we find that increasing the level of commitment always increases the buyer's profit, but the supplier's profit may decrease. Interestingly, we find that when the buyer commits to price only, there exists a win-win-win outcome where both parties will be financially better off and overall compliance of the supply chain is improved, in comparison to the scenario of no commitment. To the third research question, we find that there is a value for the buyer to commit to quantity only if the buyer has already committed to the price. Therefore, committing to the price and committing to the quantity are complementary to each other for the buyer. The supplier suffers a loss from buyer's commitment to quantity only if the buyer also commits to the price. Therefore, committing to price and committing to quantity are substitutes for the supplier. Also, we find that the change in the overall compliance of supply chain due to committing to quantity is positive only if the buyer also commits to the price.

To the last research question, our results show that when the buyer raises the standard of the code of conduct, interestingly, the supplier is more likely to be compliant with the code of conduct, even if the chance of passing the audit decreases. We show that when the auditing cost is very sensitive to increasing standard and the buyer commits to the price, an increase of the standard increases both the supplier and buyer's profit. We also find that as the standard of the code of conduct increases, the supply chain's total compliance and total profit may decrease.

## REFERENCES

- [1] UNGC - *United Nation Global Compact, Supply Chain Sustainability - A Practical Guide for Continuous Improvement*, Second Edition, 2015.

- [2] GIIRS, *Resource guide: Creating a supplier code of conduct*, [ww.bcorporation.net](http://www.bcorporation.net), [https://www.bcorporation.net/sites/default/files/documents/bestpractices/EM\\_Creating\\_a\\_Supplier\\_Code\\_of\\_Conduct.pdf](https://www.bcorporation.net/sites/default/files/documents/bestpractices/EM_Creating_a_Supplier_Code_of_Conduct.pdf), 2014.
- [3] Price D, Worse for wear: Indonesia's textile boom, *Undark- Special Project*, 2017.
- [4] Backhaus M, Fischer M, Brand damage from product harm and corporate social irresponsibility: How deep and how long, *Working paper*, University of Cologne, 2017.
- [5] Nisen M, How Nike solved its sweatshop problem" *Business Insider* <http://www.Businessinsider.com/how-nike-solved-its-sweatshop-problem-2013-5>, 2013.
- [6] Karaer O, Kraft T, Khawam J, Buyer and nonprofit levers to improve supplier environmental performance, *Production and Operations Management*, 2017, 26(6).
- [7] Plambeck EL, Taylor TA, Supplier evasion of a buyer's audit: Implications for motivating supplier social and environmental responsibility, *Manufacturing & Service Operations Management*, 2016, 18(2).
- [8] Chen L, Lee HL, Sourcing under supplier responsibility risk: The effects of certification, audit, and contingency payment, *Management Science*, 2016, 63(9).