# ROLE OF PRODUCT QUALITY AND INCENTIVES IN HANDICRAFT SUPPLY CHAIN


**A THESIS**

**SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE**

**FELLOW PROGRAMME IN MANAGEMENT**

**INDIAN INSTITUTE OF MANAGEMENT**

**INDORE**

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**01/02/2020**

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## ABSTRACT

Handicraft Industry represents an important place in comparison to other industries since it represents the rich Indian culture, traditions and heritage. The handicraft items are those products which are made either completely by hand or with mechanised equipments as long as the direct manual contribution of the artisan happens to be the most substantial contribution of the finished product. These can be “aesthetic”, “artistic”, “creative”, “culturally attached”, “decorative”, “functional” and “religiously symbolic”. This sector is primarily unorganized and employs around 1.48 crore people mainly consisting of economically backward artisans spread across different states of India. These artisans are skilled to make a variety of handicraft items based on its geographical location, depicting the cultural heritage and diversity of our nation. Apart from being the second largest employment generating sector after agriculture, this sector has witnessed significant growth both in domestic and foreign consumption over the last decade. Since handicraft products do not fall into the category of luxury or necessity goods, the complication at the retailer level is noteworthy. The motivation of our dissertation comes from two of such challenges witnessed in India at the retailer level.

In the first chapter, we consider a product line design problem in the context of varying product knowledge from different customer segments entering the retail store. The utility of the product lie in its property of being aesthetic, decorative, functional and religiously symbolic. We consider two specific scenarios – customers are segmented and not segmented. In the first scenario, we assume two customer segments – low segment (Indian customers) and high segment (foreign customers) and show how retailers design their product keeping in mind individual rationality and incentive compatibility in their decision making. We obtain analytical solutions for optimal price, optimal quality and optimal profit for both the customer segments. We show how varying product knowledge can play a decisive factor in designing the final product for the customers. In the second scenario, we consider two sub-cases where retailer exercises the option of serving either of the customer segments. We compare analytical results across scenarios and discuss meaningful implications by comparing product quality and prices and also discuss scenarios where retailers remain more profitable. We further discuss the implication of proportion or size of each customer segment, its penalty and reward structure in product line design decisions.

In the second chapter, we consider a procurement contract problem between a handicraft retailer and an artisan extending the flow of information of target quality level from the customer to the artisan through the help of the retailer's incentive transfer price design. We consider a two part transfer price model in which the first part represents the retailer's announced price for the customer's desired quality and the second part represents the reward and penalty structure if the artisan succeed or fail to adhere to the requirements of the retailer. Retailer, on the other hand, would also incur a similar penalty/reward structure from the customer due to degree of adherence to target quality level. Using a stackelberg game theoretic model, we attempt to capture the equilibrium desired and final quality levels of the retailer and artisans keeping in mind the penalty/reward incurred from both the players in the supply chain. We derive structural results and infer research and practice implications and the interplay for model features in the form of effort, announced price and penalty/reward dynamics for both the players.

Our dissertation attempts to link the decision making process of the entire supply chain in the handicraft industry by pivoting the challenges faced by the retailers both at the customer (downstream) and as well as the artisan (upstream) level. We discuss research, practice implications and point out limitations of our dissertation that can provide opportunities for future research in this scope of work.

**Keywords:** Product Line Design, Procurement Contract, Theory of Incentives, Non-Linear Optimization, Stackelberg Game, Handicraft, India

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