Supply Chain Management in the Chemical Industry: Trends, Issues, and Research Interests

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Abstract: Over the last decade, the global chemical industry has experienced one of its worst economic storms in recent history. In their bids to get through the unprecedented long economic downturn and to survive in the new economic era, many chemical companies have turned to reconfiguring their supply chains and revamping their operations. Inevitably, these structural and operational transformations and recent developments in the sociopolitical environment have brought several supply chain operational issues to the fore. This paper focuses on three primary issues. First, it identifies the key characteristics of supply chains in the chemical industry, which warrant management approaches that differ from those of other industries. Second, it discusses extensively the latest trends in chemical supply chains and the key supply chain operational issues that have unfolded over recent years in the chemical industry. The highlights of latest supply chain trends and issues enable readers to gain a good insight of current status as well as short term future of chemical supply chains. Third, this paper gives a brief overview of research work that has been done to address supply chain operation problems. Besides identifying gaps in the field of supply chain operation research, industrially relevant research opportunities that are gaining researchers’ interests are also distinguished in this work.
1. Introduction

Since the late nineties, the global chemical industry has sunk into economic doldrums. The woeful state of the chemical industry has also been augmented by a series of unfavorable events unfolded over the last few years that have crippling effects on the industry. The opening up the world’s economy has led to competition of unprecedented intensity on the global stage. The last 5 years have witnessed flurry of chemical manufacturing activities migrating to low cost regions like Eastern Europe and Asia while the manufacturing bases in developed nations like United States and countries among Western Europe continue to shrink. Unfortunately, the increased in chemical plant capacities in low cost regions has taken its toll on the prices of their products as competitors fought fiercely to gain or retain their respective market shares. The economic downturn that hit the Asian region in 1997 and subsequently the economic powerhouse nations like US, Europe and Japan in early 2000s dampened the demand of chemicals. As a result, the downward pressure on the prices of chemicals is unusually prolonged.

As chemical companies struggled to cope with weak demands and declining prices of their products, the infamous September 11, 2001 terrorist attacks in New York threw almost all industries including the chemical industry into disarray. Chemical companies have to incur higher operating costs due to tightened security measures imposed by authorities to counter terrorism. The wars in Afghanistan (2001) and Iraq (2003) not only dashed hope of speedy recovery of the global economy. The retaliatory military actions led by the United States have also sent the feedstock prices soaring and further squeezed the margins of chemical companies (Glasgow, 2003). Overburdened with debts and poor economic outlook, the chemical industry’s credit profile has slide to its worst level in memory in 2003 after a slew of credit downgrades (Chang, 2003) among the listed US chemical companies. This latest round of credit downgrades clearly bears testimony to the unfavorable sentiments of the global chemical industry. Moreover, the recent surge in crude oil price from about US$25 per barrel in April 2003 to more than US$60 per barrel in August 2005 may have brought cheers to the oil companies. But this spike in crude oil prices has also caused feedstock prices to skyrocket further which in turn has detrimental effect on margins of downstream chemical companies such as plastic makers. Due to intense business competition, many of these companies face difficulty in passing the feedstock increase to their customers, an issue which was highlighted in the 15th Asia Plastics Forum which was held in Singapore on April 25, 2005.

Despite being on their lows, companies in the chemical industry remain tenacious in their efforts to ride out of the economic turmoil. In their bids to