



CWFC Facts 013

# Canadian Wood Fibre Centre

## Fibre Facts



### Working together for an efficient value creation network

Laval University professors and Canadian Wood Fibre Centre researchers recently produced a scientific report on the Canadian wood fibre value creation network. In addition to describing what this value creation network consists of, this technical document discusses the planning decisions to be taken to oversee the network, key business procedures to be followed to ensure the creation of value, and current technologies for making the network easier to manage. The report also covers one of the key components of the network: players working together to more effectively synchronize operations and at the same time reduce the so called “bullwhip effect”.

In order to process forest resources into products and services that effectively meet market requirements, many operations are required and many organizations must get involved. This complex group of organizations, which interact with one another in various ways and work together to create economic value, is known as a value creation network. It encompasses all of the activities associated with the flow of materials to markets: resource harvesting in the forest; transportation; resource processing operations; and final products shipped to the consumer. In the past, these activities were usually planned separately based on independent objectives and according to local operating restrictions. Nowadays, however, organizations know that they have a close relationship with their partners and that they must co ordinate their activities in order to add value to their products and services.

A key component and characteristic of value creation networks is the asymmetrical flow of available information to each network member. When a wholesaler sells various types of paper to its printing firm customers, it has access to specific information

concerning the orders and can decide whether or not to share this knowledge with the paper manufacturer. However, if the wholesaler decides not to share this information, the paper manufacturer must plan its production based on the wholesaler’s orders rather than on the printing firms’ actual demand. This will have a negative effect on the value creation network’s performance, resulting in either an oversupply of stock or shortages at the paper plant or sawmill, or even shortages in the forest, as well as lengthy delays and poor service. The scientific community describes this phenomenon as the “bullwhip effect”, whereby the information transmitted in the form of orders tends to become distorted and possibly misleads members upstream from the network when they make their planning decisions. This imbalance also tends to get worse the further one goes up in the network (Figure 1).

More specifically, there are four factors that cause this imbalance. The first is the fact that businesses usually plan their operations based on the orders of players downstream from the network rather than on the end customers’ actual demand. Thus, the quantity produced corresponds to the actual requirement plus a “certain amount” that tends to increase as one goes back up the network. The second factor is the rationing that occurs when demand exceeds available capacity. In the event of a shortage, the producer will try to ration the supply of product in order to meet the demand of all of its customers, whereas each customer will tend to submit orders that exceed actual demand so that they receive ample quantities. The third factor is batch orders which contribute to the bullwhip effect because they do not represent the final customer’s actual requirements. The fourth factor is price fluctuations, because a low price during a given period will encourage buyers to order a large quantity, following which they will wait for a period of time before placing another order.



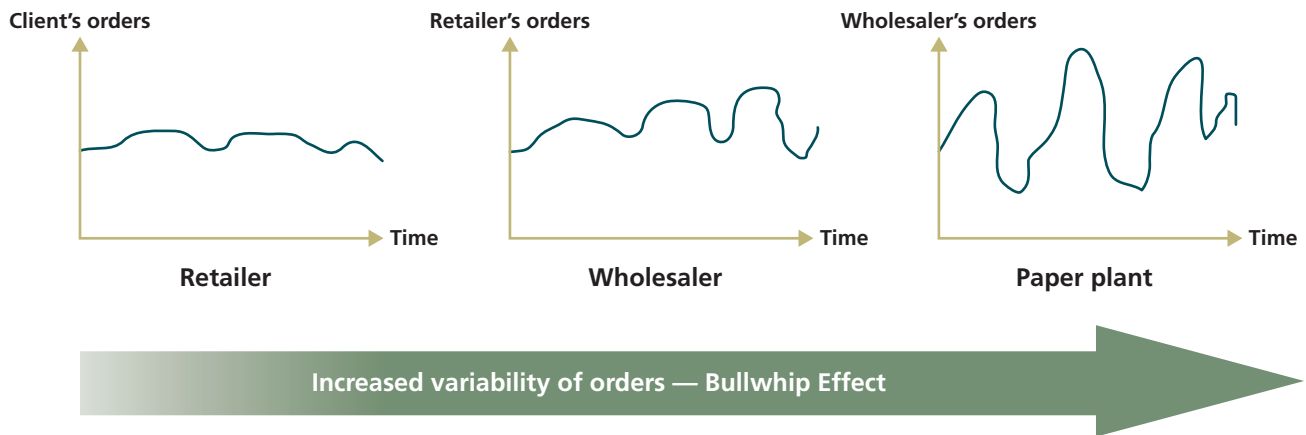


Figure 1. Bullwhip Effect

To prevent the bullwhip effect, businesses must therefore co operate to a greater extent with their suppliers, distributors and clients, share all necessary information with them, and take the situations of other organizations into account (such as their stock, capacity and demand, etc.) in their planning. In so doing, upstream businesses not only improve their own operations, but also increase the efficiency of the entire value creation network.

In addition to explaining the bullwhip effect, the scientific report provides us with additional information on the following: supply chains for softwood lumber, wood panels, engineered lumber, pulp and paper, and energy; product flow as well as the flow of information shared within these value creation networks; and various planning decisions pertaining to network strategies, tactics and operations. Case studies are also provided throughout the document to demonstrate each concept.

The scientific report may be consulted at the following address:  
<https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2012-34.pdf>

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