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# Supply Chain Risks Analysis of a Logging Company: Conceptual Model

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## Abstract

Supply Chains today are vulnerable to uncertainties and risks that might disrupt their operations which could lead to a drastic loss in revenue, competitive advantage and profitability etc, if not managed effectively. This is a concern especially in logging companies where unfavourable weather conditions can hinder the production processes, deliveries and sales etc. This article will analyze the risks the supply chain of a logging company is facing, develop a conceptual model, and translates the conceptual model into a simulation model by exploiting MATLAB. The impact of the risks on the harvesting process is then investigated by utilizing simulation, and the results are discussed to enable the logging company to become well aware of the risks confronting their organization.

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*Keywords:* Supply chain risks; Conceptual model; Simulation model

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## 1. Introduction

Supply chains today face greater risks than their supply chain managers could recognize and in fact, Christopher and Peck clearly stated that ‘in today’s uncertain and turbulent markets, supply chain vulnerability has become an issue of significance for many companies and appropriate researches on resilient supply chain are yet to be conducted’<sup>1</sup>. In addition ‘the numbers and types of threats that can undermine a supply chain are now greater, and

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organizations are facing greater challenges in managing risks than ever<sup>2</sup>. According to Business Continuity Institute Report in 2015, the three top causes of supply chain disruptions are unplanned IT and telecommunications outage (64%), cyber attack and data breach (54%) and adverse weather (50%). Moreover, transport network or disruptions accounted for 38%, outsource failure 34% and Fire 20%<sup>3</sup>. In logging companies, adverse weather conditions, transport network disruptions, outsource failure and fire are detrimental to supply chain operations and should therefore be taken into consideration. This article therefore examines the risks facing a logging company in Latvia in which a conceptual model is developed and translated into a simulation model to portray the impact of the risks on the harvesting processes along the supply chain. The research method is a case study approach in which quantitative and qualitative data are collected from the ‘Central Statistical Bureau’, Latvia and a company ‘L’. Firstly, the article depicts various definitions of the supply chain and highlights their overlapping meanings. Next, the risks facing the supply chain of the logging company ‘L’ are discussed. A conceptual model is then developed and later translated into a simulation model. The results of the research and conclusion are then given finally.

## 2. Supply chain

The supply chain, with so many definitions consisting of overlapping terminology and meanings, has evolved greatly over the past 50 years from the traditional form where big and powerful companies used to be wholly and solely responsible for supplies, manufacturing and distribution to the modern innovative companies that are actually outsourcing almost all the processes in the supply chain’. In fact, ‘this has influenced the definition of the supply chain which now consists of several overlapping terminology and meanings’<sup>4</sup>.

Table 1 Various definitions of the supply chain<sup>4</sup>.

Author(s)	Year	Definition of Supply Chain
Lu, D.	2011	...a group of inter-connected participating companies that add value to a stream of transformed inputs from their source of origin to the end products or services that are demanded by the designated end-customers... <sup>5</sup>
Pienaar, W.	2009	...a general description of the process integration involving organizations to transform raw materials into finished goods and to transport them to the end-user... <sup>6</sup>
S, Cholette	n/a	...a sequenced network of facilities and activities that support the production and delivery of a good or service... <sup>7</sup>
Sunil, C., Meindl, P.	2004	...consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request... <sup>8</sup>
Croker, J.	2003	...a total flow of materials, information and cash through a business network, all the way from the suppliers’ suppliers to the customers’ customers... <sup>9</sup>
Ayers, J. B.	2001	...life cycle processes involving physical goods, information, and financial flows whose objective is to satisfy end consumer requisites with goods and services from diverse, connected suppliers... <sup>10</sup>
Little, A.	1999	...the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it... <sup>11</sup>
Beamon B.	1998	...a structured manufacturing process wherein raw materials are transformed into finished goods, then delivered to end customers... <sup>12</sup>

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