



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

DO "LOGISTICS FAMILIES" RESIST THE CRISIS? CONFRONTATION OF BURMEISTER'S TYPOLOGY WITH CRISIS SITUATIONS EXPERIENCED BY LOGISTICS PLAYERS

An analysis based on the theory of
conventions

Nicolas Jouve, CEREMA Nord-Picardie, ESPRIM



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

Structure of the presentation

1- The research framework

2- Why this research ?

3- Risk management in logistics

4- The theory of conventions

5- Results



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

1- The research framework

- Cerema Nord-Picardie
 - Research Team ESPRIM

- Thesis (2017-2020)
 - Paris-Est University
 - Discipline : Economics (sociology)



2- Why this research ?

- My initial question : How do logistics actors manage exogenous hazards and the risks they generate, and how do they coordinate for this?
- Why this question ?
 - Risk = hazard * vulnerability
 - Logistics chains more and more vulnerable (complexity of networks, remoteness, JIT, etc.)
 - Exogenous hazards have increased significantly in recent decades (natural disasters, epidemics / epizootics, terrorism / organized crime, cyber risk, technological hazards, geopolitical hazards, strikes, etc.)
 - September 11, 2001 => -13% production for Ford in the last quarter
 - Tsunami in Japan in 2011 => shortfall of 140,000 vehicles for Toyota,
 - NotPetya (2017) => - 100 M for Reckitt Benckiser,
 - SNCF strike 2018 => - 60 M for Fret SNCF,
 - COVID 2020 ...
 - Growing interdependence => "domino effects" => need to coordinate



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

3- Risk management in logistics (1/2)

- Supply chain risk management (SCRM) = set of risk management procedures
- 4 steps, with objectives and tools :
 - 1 – Risk identification** : hazards and vulnerabilities
Tools : exchange of information, feedback, brainstorming, quality management tools...
 - 2 – Risk evaluation** : risk measurement, in particular its economic and financial impact
Tools : IDEM
 - 3 – Risk treatment** = measures to manage risk and crisis
 - 4 – Risk monitoring** : monitoring of the evolution of risks (hazards and vulnerabilities) + control of the selected risk management procedures
Tools : Feedback on the crisis, weak signals...
- Coordination is identified as an essential factor of the SCRM (Hallikas et al., 2004, Fabbe-Costes, 2007, Kauppi et al. 2016) ...



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

3- Risk management in logistics (2/2)

- But, this procedure is actually hardly used (Lavastre and al., 2012). Why ?
- Because the SCRM can only function in a context of "substantial" rationality, in which the individual is omniscient and optimizer.
 - the tools proposed imply having access to all information and aim to achieve the best result
- In reality, most of the logistics players are procedurally rational
 - limited access to information, and do not necessarily seek to optimize their results (Simon, 1976)
- But how do they coordinate in a such uncertain context ? Thanks to conventions



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

4- The theory of conventions (1/3)

- Theory formalized in 1989
 - used in economics, sociology and management
 - Question: how do autonomous players manage to coordinate?
 - The conventions reduce uncertainties between agents and therefore make it possible to coordinate
 - Several definitions... « landmarks to which individuals confronted with uncertain situations refer to decide on the behaviors they will adopt » (Nizet)

Examples: stay on the right in the metro escalator, shake hands when you meet...



4- The theory of conventions (2/3)

- Conventions are the cement of coherent sets of values, of “production worlds” (Salais and Storper) :
 - the professionals of each world use the same convention(s) to coordinate

	Specific production resources	Standard production resources
Dedicated Market (differentiated products)	INTERPERSONAL WORLD (professional)	MERCHANT WORLD (flexible)
	<ul style="list-style-type: none"> - identified applicant, bespoke production - spécifique resources <p>Examples : tailor, high-end car manufacturer offering unique models</p> <ul style="list-style-type: none"> - Convention to coordinate : trust 	<ul style="list-style-type: none"> - identified applicant : large-scale but differentiated production at the end of the chain - standard resources <p>Example : medium-sized and mass distribution with numerous references for each product range</p> <ul style="list-style-type: none"> - Convention to coordinate: flexibility, adaptability
Generic Market (undifferentiated products)	INTANGIBLE WORLD	INDUSTRIAL WORLD
	<ul style="list-style-type: none"> - The same products for all the applicants - Spécific resources for innovative production <p>Examples : new product families, new technologies potentially targeting a large market</p> <ul style="list-style-type: none"> - Convention to coordinate: innovation, strong intellectual added value ... 	<ul style="list-style-type: none"> - The same products for all the applicants - Standard resources for mass production <p>Example : Hard Discount stores with little variety in products</p> <ul style="list-style-type: none"> - Convention to coordinate: optimization, profitability, low cost products always available



4- The theory of conventions (3/3)

- Burmeister (2000) used the work of Salais and Storper to define a typology
 - logistics and transport organizations belong to 4 logistics families characterized by five factors :
 - Nature of production resources (SetS)
 - Nature of client demand (SetS)
 - Production scale
 - Variety of production
 - JIT or not, stock level
 - Each of the 4 families is also characterized by logistics and transport strategies and by ways of coordinating : massive flows of goods in the industrial family, direct contacts in the interpersonal world...
- This typology was realized from a survey with industrialists coordinating in undisturbed periods...
 - is it valid in times of crisis? Does the crisis modify the characteristic factors of families?



5- Results (1/5)

	Producer of glass bottles and jars => Performer (COVID crisis)	
	INTERPERSONAL WORLD	
	Undisturbed period	Disturbed period
Criterion 1 : nature of client de- mand	-dedicated market : numerous references (personalized decoration) and bespoke production	-dedicated market
Criterion 2 : nature of production resources	-specific resources : highly qualified human resources for the development of new products and for the adaptation of production tools	-specific resources : the high-level skills of the site engineers and chemists were mobilized to adapt the last remaining furnace
Criterion 3 : production scale	-200 million bottles and jars per year. 7 million go to the performer site. -continuous production for this customer. Production by campaigns for certain products for certain customers	- 20% of the usual level for this client, during the first phase of the crisis (prioritization phase) -continuous production but on a single furnace and only for 5 references for which the level of stock and work in progress was insufficient. Easy and high volume productions were favored during the crisis
Criterion 4 : Variety of production	- 15 references produced for this client	-5 references produced (and delivered) the others delivered from stocks



5- Results (2/5)

Criterion 5 : JIT and stock level (and trans- port flows)	<ul style="list-style-type: none">-No JIT in this production sector (NB: 70 to 120 days for production, depending on the reference)- safety stock at the producer and buffer stock at the customer to deal with any unforeseen events. Up to three months of safety stock, upon customer request, depending on the strategic nature and volatility of the range.- one to two trucks per week, provided by external service providers, chartered by the producer.- logistics organization around a hub	<ul style="list-style-type: none">-prioritization of needs : production only for priority products (strong demand from the perfumer customers) with a low stock level. Remainder of deliveries from safety stock and work in progress.- one to two trucks per week at the start of the crisis (loaded with product references and references in stock), then the perfumer reduced and then stopped production. The number of trucks sent has consequently decreased.-no problem finding carriers, the same as usual: charter still made by the producer.- same logistics organization around the hub
Relationship with the client	<ul style="list-style-type: none">-contract which specifies in particular a level of safety stock for each reference (paid)-the contract also gives a price for each reference, an annual and monthly volume, a quality level and a service rate-quality is specified in a specifications document and verified by checks carried out by the producer and his client-the production and delivery times, which are part of the service rate, are specified in a monthly schedule established by the client.-day-to-day relationship: person-contact identified within the logistics department of the producer for the customer to be able to follow his orders (emails and telephone)	<ul style="list-style-type: none">-Main differences: day-to-day contacts were more frequent at the start of the crisis, especially to reassure the client, then aimed to ensure the possibilities of reception in the second part of the crisis, then to have a longer-term vision of the customer orders for the end of the crisis. The level of interlocutors was also higher during the crisis-No face-to-face meeting during the crisis because of its nature (Covid crisis, privileged remote exchanges, many people teleworking on both the producer side and the client side).



5- Results (3/5)

	Cement producer => subway tunnel arch builder (SNCF strike 2019/beginning of 2020)	
	INTERPERSONAL WORLD	
	Undisturbed period	Disturbed period
Criterion 1 : nature of client demand	-dedicated market : bespoke production	-dedicated market
Criterion 2 : nature of pro- duction re- sources	-Specific resources: rare know-how to be able to produce this cement, which has not been produced in France for years	-Specific resources
Criterion 3 : production scale	- continuous production -quantity: equivalent of 10 trucks per day to the client	-continuous production -10 trucks per day (5 to one plant, 5 to the other), Monday to Friday
Criterion 4 : Variety of pro- duction	This producer produces several ranges of cement but only supplies one type of cement, very specific, to this customer	IDEM



5- Results (4/5)

Criterion 5 : JIT and stock level (and transport flows)	<ul style="list-style-type: none">- no JIT strictly speaking but "JIT downstream of production" ("delivery" JIT) by trucks between the "deported silos" and the customer's factory-3 train (SNCF) between the producer factory in eastern France and the deported silos in Paris area- then trucks (niche market: same carriers for a long time) between these silos and the client's two factories: 10 trucks per day (5 to one factory, 5 to the other), from Monday to Friday, between the deported silos and the client's 2 factories	<ul style="list-style-type: none">- the "delivery JIT" could be maintained thanks to the transport solution put in place, maintaining a good supply of the deported silos;-There were no more trains during the strike, so 50 trucks per week to the deported silos (80% provided by historical service providers and 20% by more expensive "mercenaries")-then classic organization from these silos to the client (10 trucks per day)
Relationship with the client	<ul style="list-style-type: none">-contract specifying volumes per year and frequency (5 trucks + 5 trucks, 5 days per week), price, penalties in the event of delay in deliveries- cement standards specified by the specifications of the Grand Paris Express- web platform used by the customer to specify delivery times (for the coming week or even until D-2)- regular contact with sales professionals, follow-up meetings once a month: collect any complaints, reassure	<p>Only change: a few questions asked at the start of the crisis to sales representatives (by phone and in follow-up meetings) to find out about the planned logistics solution and any anticipated difficulties.</p>



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

5- Results (5/5)

- The other case studies seem to confirm that logistics families are resisting the crisis:
 - changes only marginally for criteria 1 to 5
 - little change in the way of coordinating: essentially more exchanges and / or at higher levels to validate the crisis and post-crisis mechanisms
 - sometimes changes concerning the mode of transport, but which don't affect the producer / customer relationship
- Only 15 interviews (+15) : to be continued !
- The results and the methodology of this research could be used :
 - to identify the interactions between producers and their clients in an undisturbed situation and during a disturbance,
 - to better understand these interactions,
 - To better understand the potential differences between the “normal” period and the period of crisis.



Cerema

Centre d'études et d'expertise sur les risques,
l'environnement, la mobilité et l'aménagement

Thank you for your attention

CONTACT

nicolas.jouve@cerema.fr