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RÉSUMÉ – Le mouvement des Gilets jaunes en France (2018-2019) a privilégié l'occupation de ronds-points, en bloquant ainsi l'accès de zones commerciales et l'entrée de nombreuses villes. L'une des conséquences est la profonde déstabilisation des chaînes logistiques agroalimentaires, avec l'émergence d'un nouveau modèle, fondé sur de multiples micro-perturbations locales (blocage de ronds-points), qui complète l'ancien modèle, fondé sur un nombre réduit de macro-perturbations globales (blocage de hubs).

MOTS-CLÉS – fragilité, crise sociale, réseaux sociaux, chaîne logistique, rond-point, Gilets jaunes

FULCONIS (François), PACHÉ (Gilles), « Food supply chain fragility. A reading of the Yellow Vests crisis »

ABSTRACT – The Yellow Vests movement in France (2018-2019) is focused on the occupation of traffic roundabouts, on the blocking to commercial areas and to the entry of many cities. One of the consequences is that food supply chains have been completely destabilized, with a new model emerging, based on multiple local micro-disruptions (traffic roundabouts blocking), which complements the old model, based on a reduced number of global macro-disruptions (hubs blocking).

KEYWORDS – fragility, social crisis, social networks, supply chain, traffic roundabout, Yellow Vest

# FOOD SUPPLY CHAIN FRAGILITY

## A reading of the Yellow Vests crisis

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### INTRODUCTION

Starting in October 2018 and throughout the winter of 2018-2019, France was shaken by a major social crisis, surprising both in its protests, its occasional excesses and its modalities. What we call the Yellow Vests movement appears to be a genuine “marker” of a deep crisis of representative democracy, to use Grunberg’s (2019) analysis. This movement is an event whose origins, motivations and implications will be understood through work in sociology, ethnology, social psychology, but also in economic and political sciences. However, it is already possible to take a more distant look beyond its highly mediatised dimension. The angle of attack chosen is that of the effects of a disorderly and sporadic movement, without any real coordination, as was the case with the Yellow Vest movement, in a country’s economy, and particularly on the functioning of its food supply chains. The research note is part of the research trend specializing in supply chain risk management, and the resilience that these supply chains are able to initiate (or not) in the event of disruptions.

The reflection, which is exploratory and programmatic in nature, leads to the following observation: contemporary food supply chains are under threat from a new form of fragility linked to the tyranny of small decisions. It takes the form of the spontaneous multiplication of micro-blocking, mobilizing a handful of gregarious individuals within a crowd, while previous work in logistics and supply chain management (SCM) focused solely on macro-blocking of platforms and warehouses by organized actors (within the framework of a trade union structure). In other words, the Yellow Vests movement has highlighted an unsuspected fragility of complex just-in-time food production-distribution systems that have adopted downstream monitoring since the 1980s. The research note is structured around the following axes: (1) the highlighting of the systemic fragility of food supply chains that condition the daily lives of millions of consumers; (2) the importance of network models in the occupation of roundabouts; (3) the interest of sociological approaches to managing tomorrow's food supply chains; and (4) in conclusion, the need for in-depth reflection on the resilience of food supply chains in situations of spontaneous micro-blocking<sup>1</sup>.

## 1. FOOD SUPPLY CHAINS UNDERMINED BY SOCIAL NETWORKS

How did the protest movement of the Yellow Vests, unstructured and based on a strong correlation recently highlighted by Boyer *et al.* (2019) “between online mobilization (on Facebook) and offline (traffic roundabout blocking)”, destabilize the functioning of supply chains in France for several weeks? According to Boyer *et al.* (2019), social networks seem to have played a decisive role in the extent of the movement. By mid-December 2018, they had counted 1,548 Facebook groups with over 100 members linked to the Yellow Vests movement. From a logistical point of view, one of the most stimulating observations is undoubtedly

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that we have witnessed a real systemic crisis, with reference to the theory of complex systems (Le Moigne, 1995).

According to the theory of complex systems, any complex system is above all an action system based on the potential unpredictability of behaviors, considering that actors construct their own representation of this complexity. Yet, understanding the Yellow Vests movement and its economic impact on the functioning of food supply chains require us to consider the components of the system under study as well as the interactions between its various components. Indeed, a food supply chain refers to the processes of production and distribution of food products. These processes involve a range of companies from producers to consumers, and require human, physical and natural resources, on the one hand, technological, economic and social innovations, on the other hand (Rastoin, 2017). Food supply chain members are obviously complementary, and when one member is affected, for example in the supply of warehouses from factories or in the delivery of stores from warehouses, the whole food supply chain -as a complex system- is affected. In other words, food supply chains paralyzed by a multitude of micro-blocking are only one aspect of a complex system whose major albeit incongruous, point of fragility has been revealed: the roundabout.

From the point of view of public management, Houk *et al.* (1996) specify that beyond its security aspects and by its engineering nature, the roundabout is an intelligent system that increases traffic flow, replacing the arbitrary decision imposed by a red light (stopping even if no one comes in the opposite direction) with a decision, in principle, thought out (examine the situation on the roundabout and decide whether or not to engage). In addition, the roundabout reduces the number of points of contact between vehicles, and consequently the potential level of accidentology (Houk *et al.*, 1996) (see Figure 1). This problem of traffic flow refers to a very old question of a logistical nature, analyzed in particular by Colin and Paché (1988). Indeed, the functioning of food supply chains is subject to a double constraint: (1) “continuity” constraint of physical flows, the objective of which is to eradicate supply chain disruptions that could ultimately result in in-store shortages; (2) “fluidity” constraints of physical flows, the objective of which is to eliminate, in the food supply chain, any redundancy or overcapacity that could generate significant costs and undermine a strategy of cost leadership.

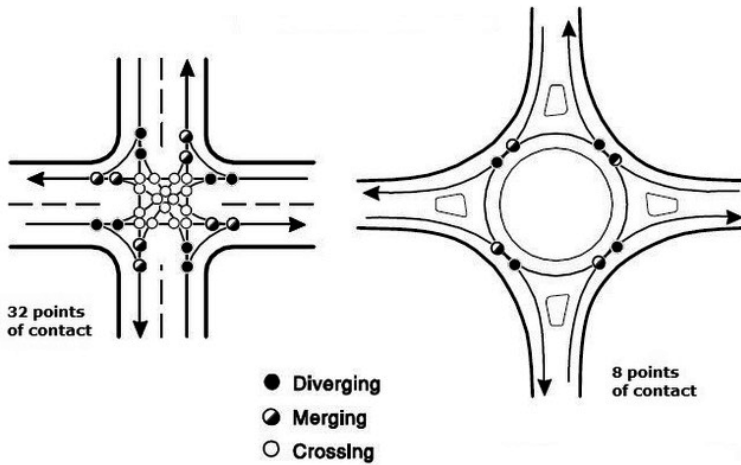


FIG. 1 – Traffic roundabouts: reduction of the points of contact (adapted from Houk *et al.*, 1996).

## 2. ROUNDABOUT OCCUPATION AND NETWORK MODELS

To say that a traffic roundabout is an intelligent system that increases the fluidity of traffic is therefore a mirror image of Colin and Paché's (1988) ideal of fluidity and, more broadly, of the industrial fluidity model in the milk industry conceived by Vatin (1990) as an archetype of the flow economy where the circulation of goods cannot (must not) be hindered at any cost. The most well-known network model is the hub-and-spoke model, which is opposed to the point-to-point model (Rodrigue, 2017) (see Figure 2). In the hub-and-spoke model, the location of a sending unit, for example a milk industrial unit, is close to a structuring axis (spoke), itself connected to a grouping and then dispatching focal point (hub), towards another structuring axis on which is located the receiving unit, for example a supermarket. Blocking the hub immediately renders all spokes inoperative, while blocking a single spoke generates only a temporary shortage in the food supply chain, the hub continuing to be powered by the other spokes.

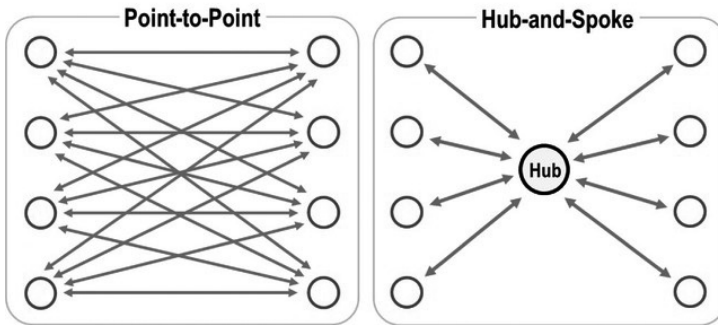


FIG. 2 – Point-to-point versus hub-and-spoke models (Rodrigue, 2017).

By occupying traffic roundabouts, it was this traffic that the Yellow Vests obstructed for several weeks. With an initially underestimated impact on food supply chains, the social movement has transformed the fluency of roundabouts, originally identified by engineers specializing in urban spatial planning (Todd, 1988), into a major weakness for the commercial activity of many food companies under the constraint of perishable products (such as fresh fruit and vegetables) or, more broadly, products with a limited shelf life with a defined expiry date (such as yoghurt). This is not a major discovery regarding the power of the crowd, this singular psychological entity, a true “transitory collective soul” (Le Bon, 1895/2009), to brutally disturb public order. On the other hand, by taking the case of traffic roundabout blocking, as a symbol of modern struggle (Gaymard *et al.*, 2019), it is possible to show how much logistics and SCM research would benefit from getting closer to sociologists.

### 3. FROM SOCIOLOGY OF COLLECTIVE ACTION TO SUPPLY CHAIN MONITORING

In the past, authors such as Durand (2007) have studied the social impacts of logistics practices on the social body, but with an emphasis on employees who are subject to “voluntary servitude” due to longer

working hours and increased mental workload. On the other hand, much remains to be done on the interaction between the functioning of food supply chains and the individual's gregarious behavior, not only as a consumer, but as an actor in their life in the context of disruptive social movements. More than ever, a first analysis of the Yellow Vests movement campaigns for a vision that is not instrumental in supply chains, but behavioral and even ethnographic in nature. This is totally in line with the current and -very lively trend of- behavioral research in logistics and SCM (for a recent synthesis, see Schorsch *et al.*, 2017), whose common point is to integrate the individual into reflection as an essential stakeholder in decision-making processes, not only in the "primary" sense (as a consumer) but also in the "secondary" sense (as an actor in a crowd), taking into particular account all their "social" depth.

Exploring the individual's gregarious behavior as a unit of analysis in its own right is indeed a research program that seems to stimulate, both for logistics and the SCM and for the management of food distribution channels (Fabbe-Costes *et al.*, 2013). The angle of attack seems even more striking in the context of phenomena leading to the emergence of an unplanned spontaneous order, as may have been the uncoordinated blocking of a multitude of traffic roundabouts during the Yellow Vests movement. The crowd clearly played a major role in the disruption that food supply chains experienced for several weeks in France. This suggests that while this crowd can sometimes be channeled and mobilized at the service of a crowd logistics strategy, discussed in particular by Mladenow *et al.* (2016) and Carbone *et al.* (2017), it can also become out of control and quickly paralyze the commercial activity of an entire country.

It is also necessary to include in the reflection the potential importance of social networks in the emergence of large-scale movements. As Arsène (2013) points out, they promote conditions for expression and collective action by relying on dimensions of power that are not easily grasped because, by their nature, they are a little institutionalized, fluid and ephemeral. From this point of view, it is clear that food supply chains are increasingly likely to be disrupted, less by organized trade unions, partly predictable in their protests, than by unforeseeable Brownian movements, along the lines of Yellow Vests that have identified the easily accessible weak points to conduct their media actions.



#### 4. RESEARCH PERSPECTIVES

The research note is voluntarily intended to be without direct field analysis with food large retailers, food manufacturers and logistics service providers who may have been affected by the Yellow Vests movement. However, our analysis highlights the importance of collective actions, even those that are spontaneous, on the management of food supply chains, threatened with disruption under the pressure of individual behaviors and interests (at times contradictory, at times convergent). The aim here is to take a critical look at food supply chain monitoring, and to suggest an original reading of it that is currently unknown in the literature and which could lead to interesting reflections by focusing on three types of actors: (1) “academic” actors through more transdisciplinary studies; (2) “private” actors through the mobilization of the main food supply chain actors who suffer social crises; and (3) “public” actors who must avoid them and, failing that, manage them as well as possible.

On the academics’ side, a resolutely transdisciplinary approach seems to be preferable. The fragility of food supply chains revealed by the Yellow Vests movement underlines the crucial importance of a renewed analysis of the risks of disruption they may face in a turbulent environment. Even though the emphasis has long been placed on “macro-risks” (terrorism, climate change, coronavirus pandemic, etc.), it is important to classify the “micro-risks” whose occurrence, in a systemic logic, could destabilize complex food production-distribution systems, more specifically the delivery of commercial spaces with food products. The case of the roundabout blocking is undoubtedly one of the elements among others of these micro-risks, whose banality has, however, hidden the stakes. Beyond the reflections carried out in food retail logistics, this necessarily requires a better understanding of the changes and social phenomena that our societies are experiencing and, consequently, by economic and sociological readings that are sometimes lacking in the analysis of logistics organizations.

On the corporate side, even if it may come as a surprise, it is possible to talk about a “Yellow Vests logistics” that has emerged spontaneously to block food supply chains, not in an insurrectional perspective, but to

publicize as widely as possible social action considered legitimate. It is reasonable to imagine that the movement will inspire other crowds in the future for other causes. Industrial and commercial food companies must therefore set up planned resilience procedures to avoid falling into the traps set by the multiplication of micro-blocking. One of the possible options is the creation of “*dormant logistics resources*”, based on the pre-positioning model of humanitarian logistics (Kovács and Tatham, 2009), which can be activated and deactivated quickly to offer diversion flows avoiding spontaneous blocking points.

On the authorities’ side, as mentioned, the multiplication of micro-blocking, which we must now learn to take seriously, can lead to a macro-blocking of several food supply chains and, *in fine*, to a partial or even global paralysis of a given territory. For the authorities, this is a major challenge. Preventing the paralysis of a territory requires taking action and implementing procedures to deal with this type of social phenomenon, the repetition of which is very likely, as demonstrated by the strikes in France in November and December 2019. Without going so far as to massively destroy the 40,000 to 50,000 traffic roundabouts in France, urban logistics schemes will have to be rethought, both in terms of the configuration of roads, the organization of mobility and the relocation of warehouses and platforms to serve the food retailing sector.

The Yellow Vests movement is indeed very interesting as it shows the power of multiple micro-disruptions in the monitoring of supply chains. Yet, that does not mean that today’s supply chains are mainly vulnerable to difficulty controllable one-off social disruptions. Quite the contrary, the Covid-19 crisis underlines that the global supply chains can be at the mercy of a virus turning into a pandemic. The first analyses carried out on the subject, in particular the article of Ivanov and Dolgui (2020), emphasized that the fragility of global supply chains is mainly attributable to the complex connections between supply chain nodes, sometimes located several thousand kilometers apart. The Covid-19 crisis raises a twofold question: the extreme breakdown of supply chains between hundreds of operators; and the geographical distance between supply chain nodes. This explains why some analysts suggest proceeding with a relocation of supply chains to avoid dependence on distant suppliers.

The lesson can undoubtedly be learned by food supply chains, but at a complementary scale. The Yellow Vests movement pointed out the

fragility of an industrial model developed over decades in reference to agri-food chains. On the geographical and organizational levels, this model distances consumers from food product producers, as do global supply chains. It would therefore be relevant to consider the systematization of short food supply chains, reducing the amount of supply chain nodes and initiating local relationship strategies, particularly with a direct link between consumers and farmers. Although short food supply chains are mainly addressed within the framework of sustainable social development (Chiffolleau, 2012), a more managerial perspective in terms of managing fragility should not be overlooked. This is certainly a research avenue of prime importance, as it seems clear that food supply chains will undoubtedly experience new crises in the future, similar to the Yellow Vests or Covid-19.

## REFERENCES

- Arsène S., 2013, « Vers une recomposition des pouvoirs: Internet et réseaux sociaux », *CERISCOPE Puissance*, p. 1-7. URL: <http://ceriscope.sciences-po.fr/> (Accessed: March 11, 2020).
- Boyer P.-C., Delemotte T., Gauthier G., Rollet V., Schmutz B., 2019, *Les déterminants de la mobilisation des Gilets Jaunes*, Centre de recherche en économie et statistique, Série des Documents de travail, n°6, Paris.
- Carbone V., Rouquet A., Roussat C., 2017, “The rise of crowd logistics: a new way to co-create logistics value”, *Journal of Business Logistics*, vol. 38, n° 4, p. 238-252.
- Chiffolleau Y., 2012, « Circuits courts alimentaires, dynamiques relationnelles et lutte contre l'exclusion en agriculture », *Économie Rurale*, n° 332, p. 88-101.
- Colin J., Paché G., 1988, *La logistique de distribution: l'avenir du marketing*, Paris, Chotard et associés Éditeurs.
- Durand J.-P., 2007, *The invisible chain: constraints and opportunities in the new world of employment*, New York, Palgrave Macmillan.
- Fabbe-Costes N., Fulconis F., Koulikoff-Souviron M., 2013, « La recherche en management logistique: la question des unités d'analyse et du périmètre », in Fabbe-Costes N., Paché G. (éd.), *La logistique: une approche innovante des organisations*, Aix-en-Provence, Presses Universitaires de Provence, p. 49-60.
- Gaymar S., Desgré M., Peulens N., Frappier A., Lecomte Q., Lenoir C., Wang Z., 2019, “The social representation of the Yellow Vests among young French people: an explanatory study”, *Journal of Social & Political Sciences*, vol. 2, n° 2, p. 305-312.
- Grunberg G., 2019, « Les Gilets Jaunes et la crise de la démocratie représentative », *Le Débat*, n° 204, p. 95-103.
- Houk M., Lasserre V., Sultan N., 1996, « L'incontournable avancée des carrefours giratoires: analyse de la prise de décision publique », *Politiques & Management Public*, vol. 14, n° 3, p. 111-131.
- Ivanov D., Dolgui A., 2020, “Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak”, *International Journal of Production Research*, vol. 58, n° 10, p. 2904-2915.
- Kovács G., Tatham P., 2009, “Responding to disruptions in the supply network: from dormant to action”, *Journal of Business Logistics*, vol. 30, n° 2, p. 215-229.
- Le Bon G., 1895 (2009), *Psychology of crowds*, Southampton, Sparkling Books.

- Le Moigne J.-L., 1995, "On theorizing the complexity of economic systems", *Journal of Socio-Economics*, vol. 24, n° 3, p. 477-499.
- Mladenow A., Bauer C., Strauss C., 2016, "Crowd logistics: the contribution of social crowds in logistics activities", *International Journal of Web Information Systems*, vol. 12, n° 3, p. 379-396.
- Rastoin J.-L., 2017, « États généraux de l'alimentation: une opportunité pour accélérer la nécessaire transition des systèmes alimentaires en France, en Europe et dans le monde », *Systèmes Alimentaires/Food Systems*, n° 2, p. 17-27.
- Rodrigue J.-P., 2017, *The geography of transport system*, 4<sup>th</sup> ed., London, Routledge.
- Schorsch T., Wallenburg C., Wieland A., 2017, "The human factor in SCM: introducing a meta-theory of behavioral supply chain management", *International Journal of Physical Distribution & Logistics Management*, vol. 47, n° 4, p. 238-262.
- Todd K., 1988, "A history of roundabouts in the United States and France", *Transportation Quarterly*, vol. 42, n° 4, p. 599-623.
- Vatin F., 1990, *L'industrie du lait: essai d'histoire économique*, Paris, L'Harmattan.