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DECLARATION OF INTEREST:

Authors disclose no financial nor personal relationship with any organization linked to their research and have not been influenced in any way. The work described has not been published previously, but the materials and conceptualization have served as an important contribution to the main author's doctoral thesis.

ABSTRACT:

This article adopts the concept of prosumption in order to better understand the array of contemporary food sustainability transition initiatives that often come under the umbrella term of Alternative Food Networks (AFNs). AFNs have developed in parallel to prosumption, which is significant because AFNs are oriented towards localized and direct relationships between producers and consumers, while prosumption explains the hybridization of the consumer into a more complex and productive actor. Scholars argue that producer-consumer reconnections enable greater transparency and information exchange between the two types of actors. In addition, digitalization has recently brought new perspectives for both prosumption and AFN research. We explain the digital food prosumption phenomenon by drawing upon several years of research on an alternative food network with strong digital focus – *La Ruche qui dit Oui!*. As a decentralized network of local food operations that converge around a digital platform, it provides innovative virtual-material mediations between producers and consumers. This suggests that increasingly, consumers may be getting more deeply engaged in the (co-)production of commodities across different sectors and activities. Thus, while the prosumption and AFN literatures have mostly existed in parallel, future efforts should be made to intersect these two areas of sociological research. This is particularly

pertinent today, as both prosumption and AFN phenomena are now increasingly mediated by powerful digital technologies. In the digital age, the alternative food prosumer phenomenon may well contribute to reconfiguring global food flows and industrial cultures towards sustainability.

KEYWORDS:

digital prosumption; alternative agri-food networks; digital food provisioning; sustainable food transitions

1. Introduction

The “prosumer” concept challenges the usual distinction between “professionals”, as price-makers, and “consumers”, as price-takers. At its essence, to be a prosumer is to produce one’s own consumption goods and services, while to be a consumer is to delegate this task to other people. In other words, with the prosumer, production and consumption are united (Kotler, 2010), hence the contractions into “prosumption” and “prosumer”. The concept originates from the 1980 book *The Third Wave* by Alvin Toffler, who viewed the industrialized cycle of consumer societies as a “second wave” of mass-market industrialization and standardization on a global scale (low prosumption). This second wave is sandwiched between two other waves: a first wave of pre-industrial agrarian societies characterized by self-production at small scales (high prosumption); and a third wave where prosumption partially substitutes consumption activities. In this third “contemporary wave”, consumers engage more deeply with commodity co-production by injecting much greater meaning and sense-making into their acts of consumption. Consumption is then considered to be embedded in cultural fields, from which value can be extracted (Toffler, 1980).

Past and recent critiques challenge the study of prosumption practices and discourses, from the blurring of the neoclassic dichotomy between production and consumption (Kotler, 1986), to the impacting idiom of “Mac-Donaldized” societies (Ritzer, 1983), to the nascent critique of consumption in information societies (Ritzer and Jurgenson, 2010). Late neo-Marxian critiques foster new theoretical approaches to cultural traits of consumption (Arvidsson, 2005; Ritzer, 2014), which are harnessed by the *metis* of marketers and commodity designers. Unsurprisingly, the marketing literature is infused with Toffler’s idiom (Prahalad and Ramaswamy, 2000; Xie et al, 2008; Kotler, 2010; Cova et al., 2011), while theories of product innovation management also acknowledge prosumption in their theories of value co-creation (Prahalad and Ramaswamy, 2004). Neo-Marxian critiques have thus latched onto this governmentalization of prosumers, but they must now also include theories on new digital communications and informational capitalism (Arvidsson and Colleoni, 2012).

Despite a wealth of food initiatives worldwide that promote digital producer-consumer reconnections, prosumption studies largely neglect food, with some very recent exceptions. Kosnik (2018) links Toffler’s prosumer to practices of self-provisioning through home-grown food. Miller (2019) examines how urban socio-technical contexts regarding land, water and energy uses can affect urban prosumer practices. Reckinger (2018) identifies forms of convergence between prosumers and ethical entrepreneurs around circular economy concepts and farming practices.

Studies on Alternative Food Networks (AFNs) shed light on a wide variety of consumer engagements that include organic agriculture, participatory guarantee systems and community-

supported agriculture. These and other forms of food consumer participation may collectively take part in redefining the provisioning of food in the modern metropolis, but also rural life in ways that go far beyond the maintenance of traditional rural communities. Indeed, as stated by Goodman et al (2012), AFNs are a “response to the glaring and multifaceted contradictions of the unsustainable industrial food system and the exploitative trading relations embedded in the global supply chains that support its growth and (expanded) reproduction” (Goodman et al., 2012, p. 4). Consumers appear to be “significant agents of change in the social and ecological relations of production”, “entrenching alternative values ever more deeply in everyday practices of food provisioning”, and at times develop “relationships of ‘trust’ with producers” (ibid, p. 5), whereby “the collective action of these social movements is directed primarily toward the market” (ibid, p. 4). AFN research has identified a tendency that aims to reduce the pace of productivism and consumerism (Petrini, 2003) and has deciphered a myriad of small worlds of food that are diversely materialized, socialized and spatialized. Yet, alternative food and prosumption concepts are rarely examined together. Food prosumption and its apparent facilitation through diverse forms of AFN therefore warrant joint scrutiny.

This article challenges the application of prosumption concepts to AFNs, and by extension to AFN-inspired concepts like short food supply chains (Sonnino and Marsden, 2006; Tregear, 2011; Aubry and Kebir, 2013), by responding to the question: how useful is prosumption, as a concept, for the characterization of the growing food provisioning practices that are carried out through AFNs? To this end, we conduct a case-study of *La Ruche qui dit Oui!* (or “*Ruche*”). While *Ruche* incorporates many of the classic AFN and prosumption practices, it is also built on a powerful Web 2.0 digital platform model, which offers a conceptual update of prosumption for our digital age. This case reveals a potential food transition pathway that articulates food provisioning systems around a dual digital-material infrastructure. Food interactions are first mediated through a digital platform that centralizes commercialization and payments. However, they are subsequently intermediated within specific “third places” (Oldenburg, 1989) through material reconnections between engaged prosumers and rural, peri-urban and urban food producers.

In Section Two, we provide some of the conceptual justifications for looking across prosumption and AFN studies. In Section Three, we present the case study and a three-tier qualitative-quantitative methodology we developed for the case-study. In Section Four, we develop three empirical results around (i) producer discourses, (ii) member (customer) questionnaires, and (iii) a typology of ‘third places’ that temporarily provide material spaces for food intermediation. These results are then analyzed so as to present two core findings about the *Ruche* system as a whole. Section Five discusses these findings and formulates a conceptual proposition to update the general definition of prosumption, based on (i) customization, (ii) transparency and (iii) the virtual-

material settings of prosumption interactions. Section Six concludes with possible areas for future research.

2. Alternative Food Networks in the age of digital prosumption

2.1. Are AFN practices and prosumption that distant?

AFN literature (Brunori, 2007; Brunori, Rossi and Malandrini, 2011; Renting, Schermer and Rossi, 2012; Kirwan, Maye and Brunori, 2017; Ostrom et al., 2017) acknowledges multiple sustainability transition themes, such as locavorism and proximity, environmental impacts of production and distribution, ethics of fair trade, food justice movements, territorial identity, quality, and nutrition/health. These studies typically explore innovative farming practices (organic farming, urban farming, agroecology) and commercialization/distribution (short supply chains, on-farm sales), but more recently include innovative modes of organization (solidarity-purchase groups, participatory guarantee systems, digital distribution networks). The rekindling of the production-consumption reconnection is an ethos of collective action that is built on two key dimensions: proximity and transparency. AFN studies acknowledge different types of proximity: geographic (reduced food mileage), organizational (reduced intermediation), material (direct producer-consumer encounters), or virtual (online food transparency information, social media interactions). These proximities may address several sustainability challenges (e.g., environmental, via reduced mileage; economic, via improved producer livelihoods; social, via increased food quality for consumers). However, most importantly, proximities help develop transparency, a value that is vital to building trust within these networks.

Also, forms of prosumer participation in the improvement of food transparency and proximity are varied. These may involve advanced food cognition (e.g., self-information based on curiosity and interest in food quality, processing and origin), or fulfilling specific functions (e.g., growing food oneself, participating in food product design, participating in production or distribution operations): this article focusses primarily on the first type (food cognition). Thus, a food prosumer actively seeks to develop complex understandings of, and selection processes for, food. Through increasingly complex commodity semantics (nutrition, quality, identity, ethics, etc.), these understandings become increasingly customized. AFNs fill these customization requirements by facilitating consumers' access to values-laden foods, which are physically brought to them and explained by the producers themselves, who now also engage more with virtual forms of

commercialization and communication. These cognitive processes of customization do not assign direct participatory or co-creation functions to prosumers. They do, however, develop practices of cognitive food prosumption, which may seem less direct than “functional” acts of prosumption, but are also increasingly widespread, be it at the food vanguard of AFNs or within the mainstream food sector. While these are not necessarily the same cognitive practices as with the old ‘defensive localism’ (Winter, 2003), ‘radical localism’ should however not prevent scholars from reflecting on diverse localist subpolitics (DuPuis and Goodman, 2005). The devices that embed localism in diverse socio-material configurations also merit attention, and these include the use of digital platforms. These devices add complexity to the study of both the asymmetrical engagements between consumers and producers and the usual localist claims to greater food transparency.

2.2. Alternative agri-food and digital prosumption

While in the areas of peer-to-peer communication, gaming, or entertainment, digital devices appear mundane, in the age of digital economics, reconnection and localism must be reconsidered through the lens of digital prosumption (Dusi, 2016). Within this scope, alternative food prosumption research may draw upon non-food prosumption literature, which explores themes as diverse as media prosumers and politainment (Berrocal, 2014), the commodification of medical patient opinion (Lupton, 2014), or the prosumption of nature conservation (Büscher and Igoe, 2013). A sociology of labor approach by Dujarier (2016) identifies forms of “organizational work” in consumers, which ranges from self-service (e.g., McDonalds tray disposal) to collaborative co-production (e.g., co-designing a product). Other distinctions are made within “active consumption” between prosumption, co-innovation and social innovation (Blättel-Mink, 2014). The concept of the “working consumer” remains paradoxical, since prosumption involves cognitive skills but also implies potentially unwitting labor enrollment. Thus, disentangling prosumer motives (e.g., curiosity, utilitarianism) from the functional tasks they accomplish is difficult (Cochoy, 2015).

In fact, successive marketing discourses which promote relational, experiential and collaborative marketing may have “created a face of consumers who are autonomous co-producers, thanks to their own competencies [...] co-producing a system of consumption by which they are subsequently molded” (Cova and Cova, 2012). Convergences also occur between business and social movements, mobilizing concepts such as post-consumerism and “marketing 3.0” (Varey and McKie, 2010). Digital economies vastly increase internet data flows from digital prosumers, and these data are exploited within prosumer capitalism (Ritzer et al, 2012), including through forms of surveillance of internet prosumer activity (Fuchs, 2011). Therefore, while prosumers may feel initially enchanted by wider participation in production and procurement, disenchantment may later

occur when prosumption becomes more streamlined than creative. This is pointed out by Denegri-Knott and Zwick (2012) when they discuss the re-McDonaldization of prosumption on eBay. Likewise, radical imaginations may more generally become contained by a hegemonic commodity-focused format of prosumption (Comor, 2011). These processes build the prosumer not as a challenger to, but a component of, the dominant logic of capitalism and neoliberalism (Ritzer, 2015).

With AFNs now well into the digital age, does the particular mix of digital infrastructure and physical encounters embodied by AFNs such as *Ruche* bring genuine novelty in the post-redux (Goodman, 2004) era? How does it fit, or not, with real alternatives in food markets (Ritzer, 2017) and with the forging of new economic relationships and civic or societal engagements in alternative, sustainable and resilient agrifood systems (Lamine, 2015)? How relevant, then, is prosumption in enriching sociological debates around food production, distribution, and consumption?

3. Case background and Methodology

3.1. The Object of enquiry

La Ruche qui dit Oui! ® (<https://laruchequiditoui.fr>) is a French company founded in 2010. It coordinates a centralized network of food operations, called “hives”, using a digital platform. The hives organize “assemblies” (temporary food distributions), where local food “suppliers” deliver pre-ordered food items directly to “members” (customers) at fixed weekly times. The digital platform hosts the company’s employees, who coordinate the network virtually. The material operation is run by independent auto-entrepreneurs called “hive-managers” who may run one or several hives. Their respective roles in this dual virtual-material arrangement are detailed hereafter. Suppliers may not be located more than 250 kilometers from a hive, as per the company’s definition of “local”. Members may order food in any quantity, and at any frequency, free of any subscription constraints.

The company’s European network (see Fig. 1 a) grew rapidly over the past ten years, reaching 1424 hives as of November 2020. France remains the core area of influence, with 745 hives nationwide, including 170 in Ile-de-France – the Paris metropolitan region and present case-study area, which has by far the densest hive concentration across the network. The European expansion, which began in 2013 in Belgium, counts in total 679 hives in Italy, Germany, Belgium, Spain, Switzerland, and the Netherlands (in order of importance).

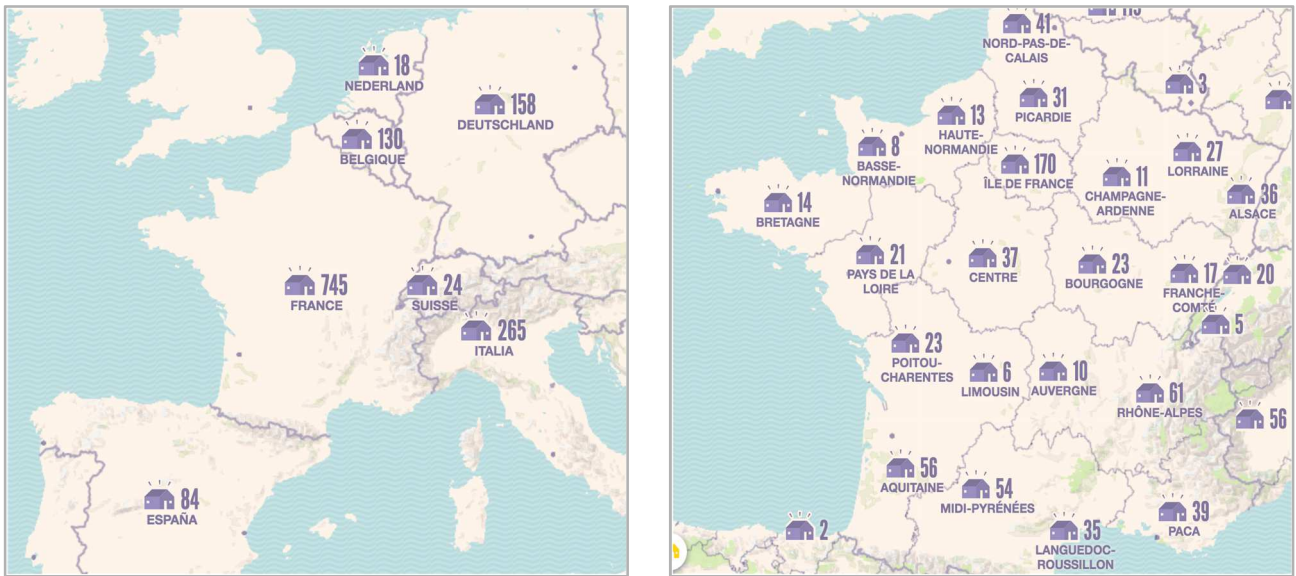


Fig. 1.a.: The Ruche network in Europe (left) and France (right). Case-study region, Ile-de-France, has 170 hives.
Source: <https://laruchequiditoui.fr/fr> (accessed on November 3rd, 2020).

Items sold cover most food categories, regrouping raw foods (e.g., cabbage, honey) and transformed foods (e.g., conserves, breads) – see Figs. 1.b and 1.c hereafter. Items are pre-ordered online 48 hours before each assembly. For each item, a description is provided, which ranges from very short to extensive. For each supplier, a description is also provided. Both descriptions are entirely written by suppliers, who thus directly “speak”, virtually, to members.

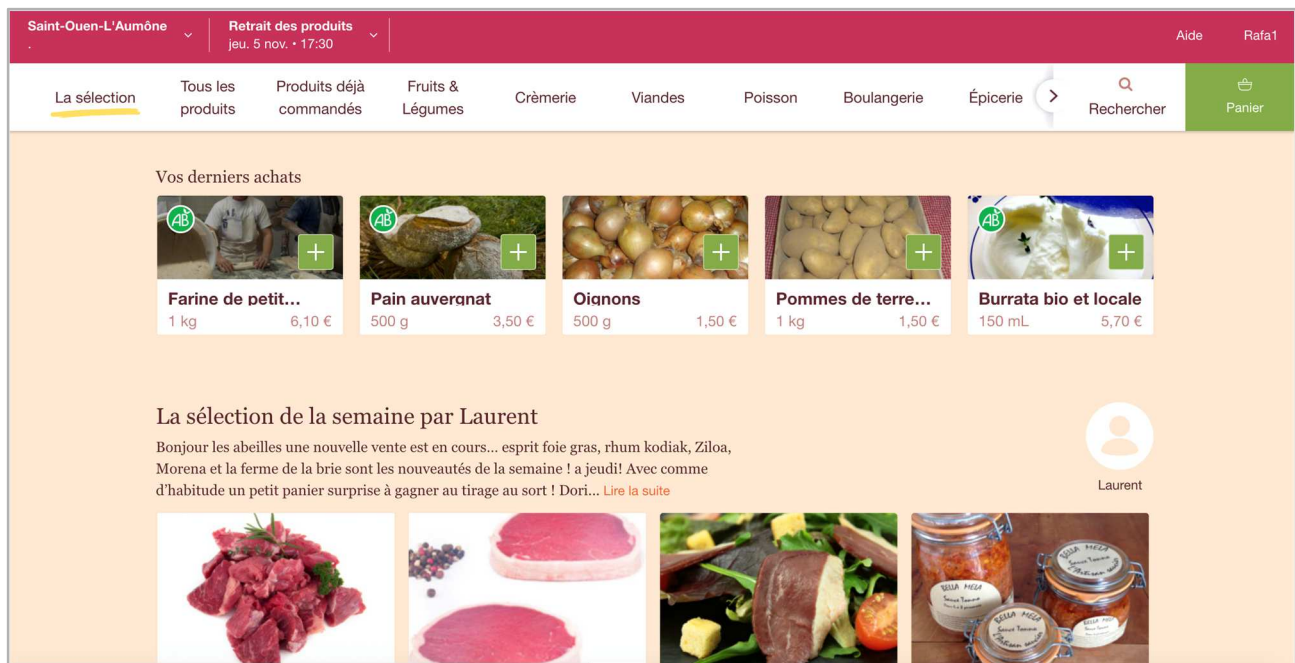


Fig. 1.b. Food categories and item examples for the Saint-Ouen l'Aumône hive situated in the north-west of the Parisian metropolis. Categories at the top are, from left to right: Selection; All products; Food already ordered; Fruits & Vegetables; Dairy; Meats; Fish; Bakery; Pantry; Beverages; Delicatessen; House & Garden (non-food category). Note that due to display limitations, the last four categories do not appear on the screen capture. Source: <https://laruchequiditoui.fr/fr/assemblies/328/collections/247173/products/category/highlighted> (accessed on November 3rd, 2020).

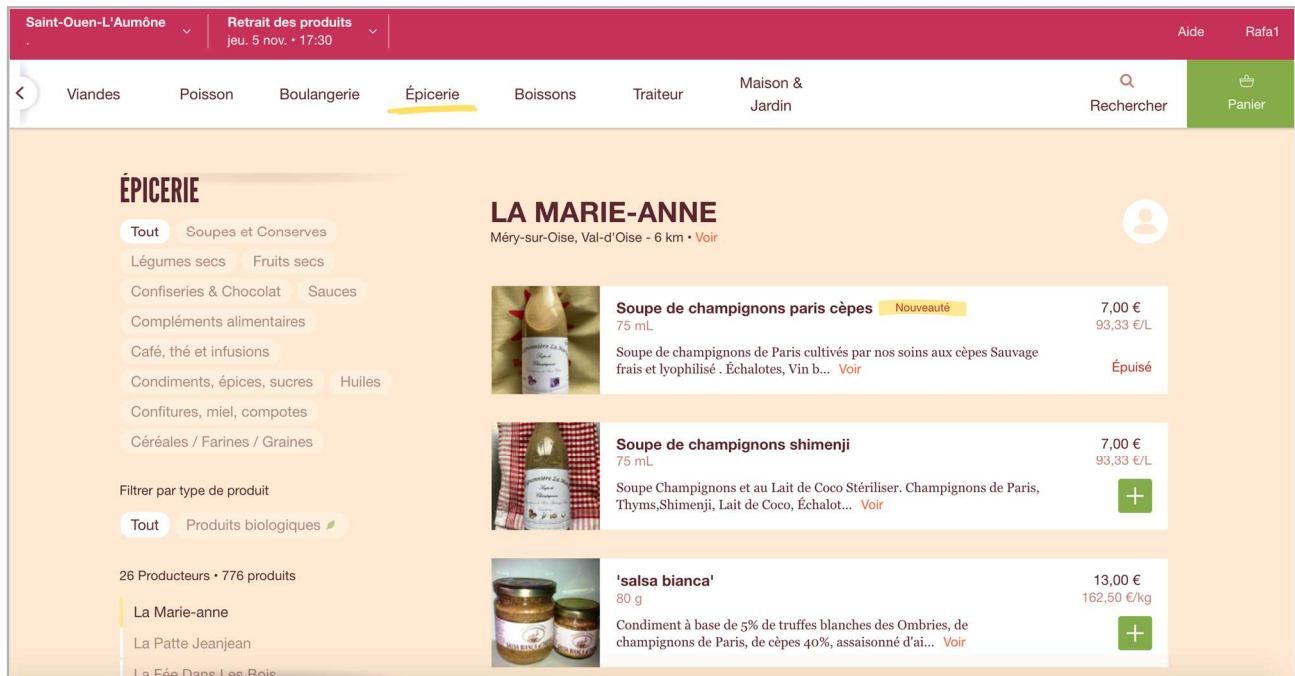


Fig. 1.c: Food selection window. Categories are further subdivided into sub-categories (e.g., “Oils” in “Pantry”). Organic products are tagged to enable filtering. Members may also click on particular suppliers to list only their items. Source: <https://laruchequiditoui.fr/fr/assemblies/328/collections/247173/products/category/492> (accessed on November 3rd, 2020).

On their website, *Ruche* claim 1500 hives, 10 000 suppliers, 210 000 regular members, and to have organized, since its creation, 225 000 distributions, representing 250 million euros in supplier revenues. Disproportionate to the European reach of its network, such figures are comparable to that of a handful of large supermarkets: this is emblematic of digital platform models, where flexible, employee-light operations can spread to continental or global scales with very little material structure (e.g., no walls) and very few employees (*Ruche* hive-managers are auto-entrepreneurs). Suppliers and hives “find each other”, with few contractual constraints, which enables a degree of experimentation in finding the right relational fit.

The Web 2.0 platform constitutes the access point to the hives in which physical encounters will subsequently take place between hive-managers, suppliers, and members. That is, the *Ruche* device articulates two dimensions:

(i) Digital e-commerce platform (called *Ruche-Mama*), operated by *Ruche* employees (mostly computer engineers, claiming “300 000 lines of code to build it”) whose role is to ensure strategic development, and seamless online selecting, ordering and payment. For these services the platform receives 11.65% of sales (note: this percentage increased significantly over the past few years, up from 8.65%). As noted above, the website’s content (food item and supplier descriptions) is mostly edited by suppliers, and the remainder by hive-managers for general communication to members. Neither of these website content providers are *Ruche* employees. Members may register with up to three hives simultaneously, and change hives as they please. Each hive has its own mini-website, all of which have the exact same aesthetic and functional structure designed by the *Ruche-Mama* platform.

(ii) Material network of hives, operated by hive-managers whose role is to: find suppliers, find a distribution point, build membership, host distributions and deal with unforeseen events (e.g., supplier quality or reliability problems; assembly space no longer available). For these services they receive 8.35% of sales (note: this percentage has remained stable over the years). Food distribution assemblies are conducted in “third places”, which host distributions for free, but otherwise exist for entirely separate purposes and are often places of socialization. Suppliers, who thus receive the remaining 80% of sales, may fix prices and minimum order amounts as they wish. Their role is to deliver food items, in good time and almost always to several hives the same day. Also, depending on the hive, they are required, or at least encouraged, to help out or to at least be present during distributions. Members, suppliers, and hive-managers may thus theoretically, in a context where no monetary exchange takes place, focus their interactions on fruitful discussions about food, leaving financial transaction issues entirely aside. In practice, however, suppliers are not always present. Being mostly small operations (often one or two employees), their resources often only allow them to conduct deliveries one half-day a week, possibly two; meaning their presence at some assemblies

can be fleeting, as they edge out to deliver the next hive on the round. When suppliers do remain present, they may equally be too busy with the logistics of distributions for in-depth discussions with members. While these logistics are coordinated by hive-managers, they may be assisted by a range of participants: suppliers able to hang around; professionals delivering on behalf of suppliers; or pro-bono participants (often members themselves). For all these reasons, supplier-member interaction is variable throughout the network, ranging from high to low degrees of interaction and knowledge exchange.

While *Ruche* suppliers may not always be able to remain physically long enough to properly converse with members, they do however, have one means of reaching members in a systematic way, through the digital platform. In directly communicating their product and supplier descriptions, they mobilize a form of ubiquitous reconnection at relatively low cost, time and effort. This type of hybrid immaterial-material device has been mentioned in debates around the *uberisation* of consumption (Peugeot et al., 2015) and in a review of European initiatives (Galli and Brunori, 2013), but not yet in the area of social studies of food provisioning or consumption theorizing.

Ruche promises “local” food (defined at maximum as 250 kilometers) and claim that one can “buy directly from producers”, “meet the producers”, “eat better” and “support local agriculture”. The emphasis is on proximity, both geographic (maximum distance allowed) and organizational (through disintermediation). Thus, suppliers speak to members virtually and may meet them during assemblies/distributions. Quality and economic support for local, small-scale suppliers are also emphasized. Yet, do the claims of this dual virtual-material device of local food provision hold up under empirical scrutiny? More specifically, how do the practices and discourses of consumers and producers, and the unusual mediations between them within particular third places, develop phenomena of food prosumption in this innovative system?

3.2. Material and methods

In studying this device we acknowledge its duality, as both socio-materially situated (where exchanges of products and information take place) and digitally constituted in Web 2.0 settings that connect members, suppliers and hive-managers. We thus designed a qualitative-quantitative approach to digital data (Venturini et al., 2014), alongside a classical sociological approach of marketplace situations and practices which considers qualitative data as enactments of this device and which enable analytical interpretations (Halkier and Jensen, 2011). This qualitative-quantitative method was designed in accordance with the nature of data available, applying digital methods (Rogers, 2013) and principles of data scraping for social studies (Marres and Weltevrede, 2013), as

well as in-depth reflection developed in and around our research group (Venturini et al., 2014; Beuscart et al., 2016). These methods combine through a data interpretation process that is based both on sociological inquiry and the mass-analysis of digital traces. Three data collection methods were thus deployed:

(i) *Primary data collection among eighteen members belonging to five different hives in Ile-de-France, in diverse types of urban areas (central city to periphery).* These mainly took the form of short, focused, semi-structured interviews (fifteen minutes on average), which asked specific questions about food diet, food shopping practices at *Ruche* and local/non-local food practices outside of it, and impressions on *Ruche*. Respondents were also asked to choose from a pre-determined set of motives for joining *Ruche* (quality; transparency; supplier economic support; geographic proximity), and to comment on the constraints of the network's particular digital-temporal-material method of provisioning. Member access merely required finding out when and where weekly distributions take place. No secondary data exists that could characterize members, so these face-to-face interviews were necessary. During the early stages of the research, it became apparent that suppliers were not always available, even for short interviews. Analysis of their digital traces provided a way to study suppliers without an interview process. While this type of characterization cannot replace the fine-grain insights gained from in-depth interviews, this digital analysis vastly gains, on the other hand, in representativeness, since every single one of the 665 Ile-de-France suppliers was analyzed, with a view to creating a macro-level picture of suppliers in their entirety. In-depth interviews, moreover, might also have lacked representativeness because of the heterogeneity of suppliers' food activities (e.g., butcher; vegetables; grain), characteristics (e.g., urban or rural location, size, age), variable availabilities or response rates, etc. The unusually rich discourse suppliers provide online makes representative analysis possible through the second methodology, which we detail below.

(ii) *Secondary data collection, openly available through each hive website (to registered members), which captured a "photograph" by extracting, using specifically developed computer coding, all data pertaining to every single item of food sold throughout Ile-de-France, amounting to 31 920 different products sold by 665 different suppliers— as of extraction date (September 2018).* These product data offer (among other data types) unique textual discourses, which suppliers write for every single food item they are currently selling on a given week. These texts are made visible to any person wishing to find out more about these food products. The 31 920 individual product discourses were scrapped and stored as a corpus to be analyzed. We used the *CorTexT.Manager* online instrument of the *CorTexT Platform*, which is housed in our research unit, both as a physical space and host of digital spaces comprised of tools, methodologies and skills to handle large textual corpora (Barbier and Cointet, 2012). This instrument develops a computational approach of

scrapped datasets and local computational hermeneutic (Mohr et al., 2015) of the contents to be deciphered from the textual data. We parsed these and performed content analysis of the particular discourses found among product descriptions thanks to a terminological extraction process, using Natural Language Processing scripts from the *CorText Platform*. This type of analysis helped identify and map frequent multi-terms (comprising two to four words, called N-grams, excluding monograms, which are often meaningless alone), which *CorText.Manager* organizes into clusters depending on the degree of cooccurrence of these multi-terms. Using the structured projection of these clusters, we constructed a thematic typology of terms which characterizes suppliers through their product discourses (values, preoccupations, marketing strategy, etc.).

(iii) *Typology of the material settings in which members, suppliers and hive-managers interact.* This data is based on the names of the entities which temporarily host distributions. These are shown individually on each of the hive websites, and we conducted web research to grasp their nature and function. Some methodological specifications and applications can notably be found in Tancoigne et al. (2014) or Venturini et al. (2014).

4. Results: the discourses and settings of “La Ruche qui dit Oui! ®”

In this section, we first present results through descriptive categorizations (4.1; 4.2; 4.3), and then analyze these together (4.4), prior to a general discussion of results in Section Five.

4.1. Result 1. Supplier digital discourse themes: a lexicometric viewpoint

We uploaded 31 920 food item descriptions written by suppliers into *CorText.Manager* and analyzed their contents using the *Network Mapping* tool. The text was parsed and structured into a list of discrete multi-terms, of which we selected the Top 500 most recurring N-grams. The software’s algorithm then calculated a network of cooccurrences between each of these with a distributional similarity measure. This network was then arranged optimally, following the Louvain community detection algorithm, into a visual map composed of clusters of cooccurring N-grams (see Fig. 2 below). The map was interpreted with an aim to define one or several potential theme(s) which might come out of each cluster, as seen below in Fig. 2 (*Network Mapping*) and Table 1 (thematic breakdown):

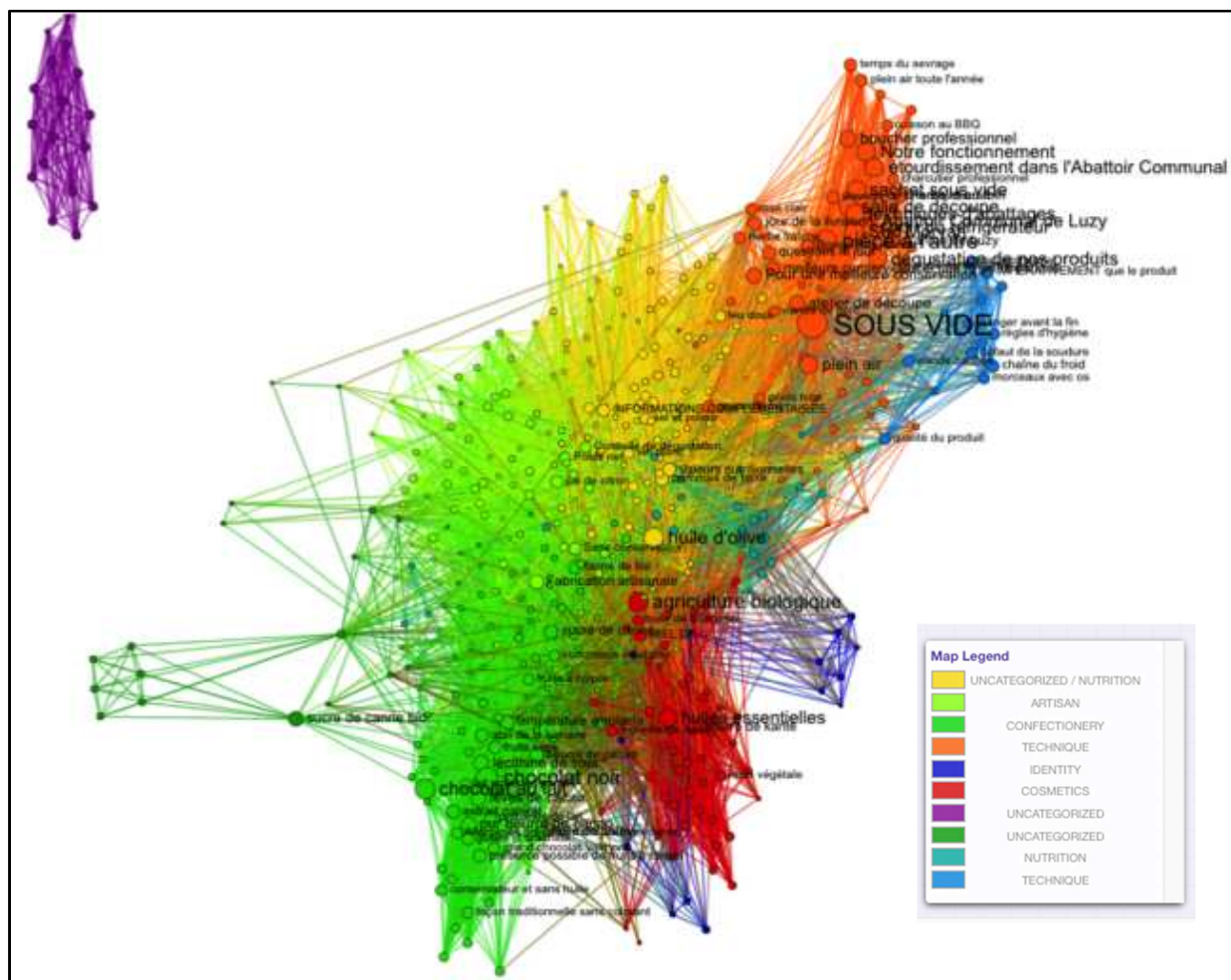


Fig. 2: Network Mapping of multi-terms (N-Grams) drawn from food item descriptions. N-Grams are represented as nodes with text (note: only some are visible in the overall map above, but during analysis it was possible to zoom in and read every single node): their size is proportional to their frequency in the dataset. Lines linking nodes represent cooccurrence links. Clusters are colored for readability. Two clusters (purple, dark green) are uncategorized due to small size and peripherality to the overall map. The yellow cluster N-Grams are mostly unrelated, except for some which relate to nutrition: this cluster is therefore partly uncategorized.

Cluster name (color on map)	Cluster themes (and foods they focus on, if applicable)	Multi-terms (selection)	Implications
TECHNIQUE (orange, blue)	<u>Transparency on technique</u> : modes of production, conditioning and conservation which emphasize naturalness (animal raising) and freshness (conditioning). Food family focus: meats.	“cutting workshop”; “dizzied in the town slaughterhouse”; “open air”; “grass and hay”; “mother’s milk”; “airtight”; “better conservation and perfect hygiene”	<u>Vertical integration</u> : meat suppliers display control on all steps of the meat production chain (from raising to conditioning), rather than being mere segments of the chain. Transparency and freshness are particularly important for meat products. Technique is associated to quality.
ARTISAN (light green)	<u>Artisan quality of processed foods</u> : foods concerned here are mostly of the processed (non-raw) type, but cover many food groups (fruits, vegetables, meats, fish, pasta, etc.).	“artisan jams”; “artisan conserves”; “artisan production”; “artisan fabrication”; “artisan pâtés”; “pure juice”; “fresh fruit”	<u>Artisanship</u> of producers renders them distinct to the agri-food industry. Their foods are distinctive because they are elaborated through unique expertise, rather than streamlined industry processes.
CONFECTIONERY (dark green). <i>Note: this cluster represents a product family, not a theme.</i>	Emphasis on naturalness, or lack of artificialness, of ingredients.	“pure cocoa butter”; “without soy lecithin”; “traditional way and without coloring”; “without preservative or oil”	<u>Naturalness</u> of confectionery foods means that they contain no or little harmful substances.
COSMETICS (red) <i>Note: this cluster represents a product family, not a theme.</i>	Emphasis on naturalness, or lack of artificialness, of ingredients.	“seed oil”; “hemp oil”; “honey”; “organic agriculture”; “no coloring or perfume”	<u>Naturalness</u> of cosmetics means that they contain no or little harmful substances.
NUTRITION (turquoise blue, part of yellow)	Emphasis on nutrition and health.	“nutritional value”; “well-being and our health”; “immune system”; “fatty acids”	<u>Distinction</u> is granted through claims that these foods offer better nutrition and health.
IDENTITY (marine blue)	Specific <i>terroir</i> (territorial identity), plant variety, or animal breeds.	“High Valley of the Chevreuse”; “Gâtinais distillery”; “Limousine meat”	<u>Distinction</u> is granted through claims that these foods have unique or specific identities.

Table 1. Cluster themes: details and N-Gram examples.

4.2. Result 2. Member diets, shopping practices, and motivations

Member questionnaire results on four themes – diets; shopping practices (at *Ruche* and elsewhere); values (reasons for joining the network); and constraints (due to *Ruche*’s particular modus operandi) – offer valuable insights into member practices. See here below in Table 2:

Theme	Sub-theme	Core results on member practices	Prevalence in sample*	Explanation for the results as expressed by members (including full interview quotes)
Diets	Cooking	- Cook daily and most of the food eaten at home.	Very high	- Nutritional control.
	Vegetal consumption	- Eat at least five fruits & vegetables per day. - Consume vegetal milks.	Very high Low	- Desire for healthier nutrition. - General health concerns. Food intolerances (e.g., lactose).
	Animal consumption	- Replace cow dairy with dairy from other animals. - Limit meat to specific periods (e.g., week-ends). - Reduce animal products.	Low Medium Very low	- General health concerns. Food intolerances (e.g., lactose). - Lower meat quantity, higher meat quality. - Ethics: animal treatment and carbon footprint.
Shopping practices	At <i>Ruche</i> : budget, frequency, core products	- Budget range: 25-50 euros. - Shopping frequency: weekly or monthly. - Products: fruits & vegetables, meat, dairy.	All	Members often purchase fruits & vegetables, meat or dairy, for diverse reasons: “I buy my fruits and vegetables at <i>Ruche</i> ”; “Near home I can’t find quality fruits and vegetables so I shop in a hive near work”; “Only at <i>Ruche</i> can I find pork without sodium nitrite, even organic stores don’t have it”.
	Elsewhere	- Members also shop at other channels (organic or conventional retail, specialty, delis, markets). - They also shop at other AFNs: solidarity-purchase groups (e.g., <i>Amap</i>); ready-to-cook parcels; French product parcels.	High Low	- “At supermarkets, I buy French products when possible”; “I also go to the butchers, or the fishmongers”; “I also buy my fruits & vegetables at the market”. - “I was registered for years with an <i>Amap</i> . When its locale shut down, this hive agreed to share its distribution point. This brought me to <i>Ruche</i> ”; “I used to be in an <i>Amap</i> , but I switched to <i>Ruche</i> : <i>Amaps</i> are too militant and require too much involvement”; “My food parcel scheme offered little freedom to cook what I wanted, so I got bored”.
Values	Quality	Members value quality above all. They define “quality” in multiple ways: it can mean fresh, ripe, distinctive, organic, non-transformed, etc.	Very High	As members state: products are: “inexpensive given their quality”; “greatly fresh”; “not easily found in Paris, even in good specialty stores”; “artisan yogurts go bad quicker, but taste is incomparable”; “fruits & vegetables as ripe are rare in town”; “fruits & vegetables being organic is important”; “I seek quality products, organic or not, if they are fresh”; “I have boycotted the food industry for years... I wish to keep a relationship with non-transformed products”.
	Transparency	Members strongly value transparency and the relational proximity to suppliers: direct interactions are deemed more trustworthy than	Medium-High	As members state: “disgusted by supermarkets’ absence of transparency, I came to <i>Ruche</i> ”; “I like the <i>Ruche</i> concept of trustworthiness with suppliers, some of whom even offer on-site visits”; “suppliers offer clear online descriptions of their products”; “organic labels are not that important, what counts is trust”; “organic labelling is not an obsession:

		certifications.		regulatory requirements are not always strict”; “we exchange with suppliers but also hive-managers, pro-bono workers, other members... it is very convivial”.
	Supplier support	Members enjoy supporting small-scale suppliers (although they are not always clear on how <i>Ruche</i> revenue is shared). They also feel that the hive-manager works hard and deserves recognition.	Medium	“I enjoy buying from small-scale suppliers”; “I have no idea how much a supplier earns through this system”; “ <i>Ruche</i> offers fair revenue partition, between: suppliers, who have chosen to sell food differently, with all the transport constraints this implies; and hive-managers, who must build a hive and set everything up, as well as deal with the rather difficult Parisian clientèle”. “It is only fair for hive managers to also receive financial compensation”.
	Distance	Suppliers’ geographic proximity is less important than the three other values.	Low	The mileage reduction, and potentially reduced environmental impacts of local supply, were hardly evoked by <i>Ruche</i> members.
Constraints		<i>Ruche</i> system constraints (temporary, much like open-air markets; and anticipatory, due to preorder and prepayment online), pose few problems to respondents.	High	As members state: “ <i>Ruche</i> simply requires anticipation and timetable flexibility”; “it’s no more constraining than my local market, which sells food from far away”; “markets on Sundays don’t suit me, because I cook mostly on week-ends: picking up <i>Ruche</i> food on Friday suits me, and it’s quicker than hopping between market stands”; “I alternate between hives depending on my timetable”; “fixed distribution windows actually help me better structure my weekly food timetable”. Other AFNs, like <i>Amap</i> solidarity-purchase groups, are considered “too constraining, you have to register for a semester”, they “require pro-bono time”, “don’t offer enough food choice”, and “are too militant”.
Criticisms		<i>Ruche</i> is considered not participatory enough, not as socially virtuous as other AFNs, and problematic in some of its capital investment and ownership structure.	Low	For members, “the system is infantilizing, not participatory enough for members: so <i>Ruche</i> is a default choice for me”; “at my holiday home, I frequent another local food chain which practices social insertion by employing disadvantaged workers”; “I feel uneasy because <i>Ruche</i> received millions in investments from an American fund and from Xavier Niel (CEO of internet service provider <i>Free</i>).

Table. 2: Member questionnaire results.

* *Very high* > 75%, *High* > 50%, *Medium* > 25%, *Low* < 25%

4.3. Result 3. third places of cultural and functional materiality

For the network to be financially viable, material spaces are required to temporarily host the hives so that its suppliers can actually deliver the food to members. It is also in these settings that

face-to-face interactions can take place, between members and suppliers as promised by the *Ruche* model, but also between members, between suppliers, and with the hive manager and occasionally pro-bono helpers. These spaces of interaction take the form of “third places”, as core settings for informal public life and sociability (Oldenburg 1989), temporarily embedding a function born from the virtual into the fabric of a physical place which otherwise exists in itself for entire separate reasons than *Ruche* distributions. Also, the socio-economic, geographic, and urban contexts of the metropolitan spaces where distributions are located can have an effect on the natures of these third places, and the density and variety of places available. Hive-manager personality and preferences also influence the type of third place which is sought in a given location. In addition, local contingencies, such as specific opportunities, or on the contrary lack of choice, may also determine where distributions occur. As a result, *Ruche* third places tend to be very diverse in nature. However, many do have commonalities, which enables us to build a typology which allows a clearer characterization of the types of places which are particularly favorable to food presumption. The typology is based on nine attributes or natures: conviviality, culture, solidarity, public space, municipal place, hive manager home, hub, supplier home, and a ninth category for unclassifiable places. These are detailed below in Table 3, and Appendix B provides a sample of these third places.

TYPOLOGY	COMPOSITION	HIVES	DESCRIPTION
CONVIVIALITY	Cafes-restaurants, co-working spaces, food specialty stores.	47	These are places of convivial interaction, through sociability, encounter, sharing, entertainment and experience (cafés, restaurants), sometimes for work (co-working). Conviviality also applies to places where advanced food interactions already occur between customers and shop workers (specialty, distinctive food stores).
CULTURE	Theaters, private or public cultural centers, cultural cafes, etc.	38	These are places infused with culture, inclined, as such, towards openness and experimentation. These may welcome new perspectives on food, a major element of human culture. Culture extends itself through food culture, a nourishment for the body, and food for thought.
SOLIDARITY	Associations, charities, religious institutions.	15	These non-profits provide solidarity, with different motives, values, ideologies, methods, publics, and themes (e.g., handicap, education/training, inter-generational help, religion). These may consider good food and nutrition a core element of solidarity. Some are religious institutions: believers may consider food “sacred” and welcome a re-natured, moral relationship to food, through seasonality, identity and human interaction with its suppliers.
MUNICIPAL PLACE	Municipally-provided spaces: schools, town halls,	11	Public spaces are underrepresented, despite seeming obvious spaces for distributions. This is due to diverse public constraints: in markets, <i>Ruche</i> competition causes unrest among incumbent food stands

	market places.		(according to some hive-managers); in schools, strangers would be temporarily admitted inside, which poses security issues; and more generally, municipalities morally consider that their free spaces should be allocated not to private entities like <i>Ruche</i> , but to non-profit entities.
PUBLIC SPACE	Outside public spaces: riverbanks, squares, etc.	9	These might be default choices if there is no other solution. They may also be voluntary choices, since some are also attractive settings. Occupying outside public space requires municipal authorization.
HIVE-MANAGER HOME		20	These might be default choices (no other solution) or voluntary choices (practical). These are mostly found outside Paris (roomier homes).
HUB	Train stations, both inside Paris walls and throughout its region. Hotels.	23 (19 train stations, 4 hotels)	Somewhat situated at the public-private interface, offering much space and constants flows of travelers, train station distributions have mostly opened up since 2016 and an agreement with the French National rail company (SNCF). Train station hosting pursues a dual dynamic which is observable worldwide: firstly, the conversion of highly valuable real-estate into shopping space; secondly, the fulfilling of societal demands for the improvement and enjoyability of urban junctions. Hotels too provide flows of travelers. Three of these here belong to Europe's leading hotel chain. Hotel hosts may become valuable distribution venues, offering room, logistical facilities (e.g., parking space, cool storage), and a major market for local food if hotel hosts themselves procure <i>Ruche</i> products for their catering services.
SUPPLIER HOME	Supplier farms.	4	These are only a handful and are mostly found in peripheral areas of the Paris region, where access to third places is lesser.
UNCLASSIFIABLE	Diverse: sports club, recycling center, campsite, mall, real-estate agency, etc.	11	Adding to the diversified place categories described above, these unclassified places demonstrate the plasticity of the <i>Ruche</i> network, which can deploy hives just about anywhere, attracting highly diverse populations (e.g., sporty, mall-shopper, camper) by "capillarity".

Table 3: Typology of third places hosting distributions. Hives can have over one attribute (e.g., "Convivial" and "Cultural"), so the hive count (178) exceeds the number of hives (169).

4.4. Transversal analysis

Looking across the results from the three material types presented in these tables provides two main analytical findings. Firstly, they help us to identify the overarching, *core themes of transparency and distinction*, which both suppliers and members consistently express throughout their different discourses (thematic dimension). Secondly, they help us draw the *organizational shape of a virtual-material network* which reconnects suppliers, members, and hive-managers within a network of third places (organizational dimension). We analyze these in turn.

4.4.1. Articulating transparency and distinction

Transparency. Members value the transparency of the information that suppliers provide virtually, particularly with certain food types where transparency is most important. For instance, meat poses severe health hazards when it is not kept properly. Livestock-related activities also raise concerns about animal-welfare. The TECHNIQUE cluster shows that meat suppliers particularly emphasize their control of different production steps, from raising to slaughter. This constitutes a form of vertical integration which is associated to notions of naturalness and animal welfare. At *Ruche*, products linked to CONFECTIONERY and COSMETICS, often criticized as artificial and unhealthy due to certain industrial practices, are also given ‘natural’ attributes. This is confirmed by members’ aspirations for more nutritional control and healthier diets and products, particularly with regards to animal products.

Distinction. Throughout their online descriptions, suppliers tend to emphasize their distinctiveness, in three areas: artisanship, nutrition, and identity. For instance, suppliers of transformed foods often present themselves as being an ARTISAN, and this is true across different food groups (e.g., fruits, vegetables, fish, meat, pasta). Suppliers emphasize that making quality processed foods requires particular skills associated to artisanship, such as individual attention, know-how, manual labor, creativity, and customization, as opposed to streamlined industrial processing practices. Supplier discourse also highlights NUTRITION and IDENTITY as distinctive qualities found in their foods. Members come to *Ruche* for a multiplicity of qualities: freshness, ripeness, taste, organic labels, rarity, authenticity, etc., sometimes for certain food types only (fruits and vegetables are often mentioned). At the same time, most members also use other food channels in conventional retail or specialty stores, so that *Ruche* is just one additional channel for certain types of products where distinction can be found.

Binary tensions. This dual thematic focus on transparency and distinction, shared and valued by members and suppliers alike, can be summarized as follows :

- (i) Segmented vs Integrated: to act in all or most stages of a production chain (integrated) allows greater control of transparency and value than acting only in one or few (segmented).
- (ii) Artisan vs Industrial: to use artisans’ particular know-how, skills, creativity and flexibility holds great potential for the development of specific food qualities and advanced

customizations in ways that industry may not always be able to rival, at least not at the same pace.

- (iii) Natural vs Artificial: to produce food naturally is highly valued because the natural is associated with health, taste, environmental friendliness, and ethics; while artificiality is perceived as the opposite of these values.
- (iv) Distinctive vs Standardized: distinctive identities in food products such as terroir, animal races, and vegetal varieties offer meaning and sense-making to food prosumers in search of customization, novelty and culture, which they are not always able to find within the standards of industry.

These tensions already exist throughout the commercial food system, particularly in conventional retail (e.g., A.O.P. origin appellations, nature-themed storytelling in advertisements, artisan quality products). However, dominant food provisioning devices seldom provide a direct line through which suppliers and consumers-prosumers can interact on questions of quality, sustainability, fairness, ethics, and other common concerns. Instead, their potential for interactions is usually altered and diminished by marketing intermediation. The powerful virtual-material communication medium provided by *Ruche* could therefore help to generalize elements of this proposed framework throughout the food system, with its alternative fringe as a starting point.

4.4.2. A virtual-material mode of organization between suppliers and members in third places

An innovative dual representation and communication medium

In this rather peculiar digital-material device, suppliers directly address members in two complimentary, but quite different ways: virtually, and face-to-face. In practicing transparency, suppliers develop new skills in both virtual and physical representation, in marketing and in storytelling. Yet they also convey personal values and develop relatively complex and broad arrays of themes. Similarly, members are encouraged to challenge their knowledge through cognitively navigating complex and multi-themed information on a wide range of different foods, both virtually and in physical interaction with suppliers. Physical interactions seem particularly important to members, as they generate additional trust towards suppliers, whose presence, however, is variable across the network. This variability also applies to virtual representations, since online product descriptions can vary from only a few lines up to several paragraphs of very precise information.

Flexible local food provision in settings with strong identities

Hives offer a rather unique type of food provisioning channel. As a networked organization which allows members to frequent and to switch at will between multiple hives, *Ruche* grants a flexibility that seems well adapted to the instabilities of modern life. Flexibility is not always the norm among certain other AFNs, which require more stable and direct engagements from members (e.g., community-supported agriculture). Although less flexible than regular shopping, the anticipated nature of food ordering also helps some members to structure their weekly food timetables. *Ruche* provides a flexible AFN space, wedged among and partially hybridized with other provisioning channels, where members conveniently procure local food, for diverse reasons and in diversified ways. These third places grant the *Ruche* shopping experience with some specific materialities which are made evident by the diversity of host spaces. These are based on value-driven identities (conviviality, culture, solidarity) or innovative functional facilitations (hubs, municipal spaces, supplier homes, public spaces). The intermediation which hive-managers provide is viewed as necessary, and deserving of their share of sales, central as their role is in structuring hives and organizing these local food assemblies.

Limits to this system?

Appreciative of its functions, members are however not devoid of criticism with regard to larger issues. In comparison with other AFNs, some find *Ruche* lacking in social reach or member participation in the strategic orientations of the network. Others were uncomfortable with it having received sizable corporate investments. Yet members are overall ambivalent: the lack of food politics or strong social ties, which dissatisfies some, is for others a relief compared to the militant, time-consuming or personally demanding nature of other AFNs. The success, thus far, of *Ruche* is as a form of “non-pure”, hybridized AFN. It has found a space wedged between “purer” AFNs such as solidarity-purchase groups and more conventional markets. We take this to be a sign, among other recent developments in the food sector, that there is still room for further segmentation in food provisioning markets, especially with regards to local food.

5. Discussion

5.1. Prosumption 2.0: customization updated by transparency

These empirical results justify an update on how prosumption is current mobilized in the literature, not only in the food sector, but also for other consumer goods (e.g., electronics, textile). Growing concerns about products and the ways they are made generate a string of new criteria which reflect our current social time. We suggest integrating the practice of transparency as a way to carry growingly complex strings of information about commodities, often through mediums that are both material and virtual. In our conceptualization, transparency and customization are intertwined: product customization information that is relevant to contemporary societal concerns appears to be legitimately conveyed through practices of transparency. This enhanced access to information develops new signs of attractiveness and distinction, which take the grammar of commodities to a new level of complexity. In doing so, these signs leverage market value past the threshold of mere consumption processes, into a new level which is most usefully characterized and theorized through prosumption concepts.

At *Ruche*, members and suppliers converse about food using these new customization signs. In the process, they also create new signs, values, and understandings. They co-construct food quality as polysemic, “good” food being in turn subjectively pleasing (e.g., fresh, tasty), healthy, environmentally friendly, territorially identifiable, organic, artisan-made, etc. These multiple criteria are themselves divisible into multiple definitions that for some, open up controversy (e.g., is organic necessarily ecological? are territorially attached foods that distinctive? is sodium nitrite so unhealthy?). Suppliers demonstratively provide virtual transparency through sizable volumes of online information: members juggle with strings of information crossed with signs that they have to decipher to understand food and revalue their food practices, hoping for the better. The suppliers’ physical presence, albeit variable, is important to members as it provides an additional reassurance akin to their desire for transparency, if not ways of developing new relationships with food professionals who are rarely encountered in otherwise highly intermediated food systems. Supplier discourse and member concerns partially overlap (e.g., both emphasize artisanship as enablers for quality foods) and partially differ (e.g., food processing and territorial identity is prevalent among suppliers, while members seem more concerned with quality and health). In this way, a tacit, non-militant, diffuse alliance against agri-industry may have formed.

5.2. A liquid-solid local food provision device

The dual character of this new customization and transparency device is somewhat paradoxical. Suppliers operate simultaneously within two dimensions that are seemingly opposed, but actually quite complementary: an informational ubiquity dimension (highly detailed virtual discourse openly accessible to all), and a geographic and organizational proximity dimension (direct delivery and physical interactions). In the realm of AFNs, this novel duality might contribute to setting new standards for local food provisioning. This paradoxical duality can usefully set a new standard for prosumption definitions themselves. The proximity dimension is physically infused with third place identities that provide situated, non-standardized, diversified shopping experiences, which inform us, as researchers, as to which material cultures most welcome local food. Members interact with suppliers, but also with other members and with hive-managers, in a collective coming together of like-minded foodies and food professionals who are organized through new arrangements of intermediation. The virtual dimension, in addition, gifts suppliers with informational ubiquity in ways that enable (and require) them to communicate unusual levels of detail to these food prosumers.

Hedged on an employee-light, tech-platform development model, this peculiar dual device can be considered a hybrid model of liquid and solid consumption (Bardhi and Eckardt 2017). It has a “liquid” dimension based on (i) a virtualization of the space for the commercialization, selection, and financial purchase of goods, and (ii) the fleeting nature (flexibility) of member engagement with regards to both hives and suppliers. It has a “solid” dimension because it requires physical encounters and interactions between members, suppliers, and hive-managers. These materialize in third places that already constitute enduring elements of the metropolitan cultural fabric.

5.3. Digital prosumption: transparent customization within a liquid-solid device?

Our empirically based proposition is a revised conceptualization of prosumption which is based on three new definitional criteria (Table 4).

Type of prosumption	<i>Ruche</i> prosumption	Explanation
Customization 2.0	Multiple food quality criteria: distinctive taste, identity, or artisan processes; ecological production mode; natural ingredients; health and nutrition; ethics of trade; etc.	Processes of understanding and decision-making on food are encouraged by rising access to information and signs, which reflect contemporary quality and sustainability concerns.
Transparency	Virtual discourse; physical exchanges; integration for better control over food production process.	The disclosure of information and signs takes place both virtually through informational ubiquity, and physically and dialectically through geographic and organizational proximities.
Liquid-solid*	<p>Liquid: ephemerality, immediacy, dematerialization.</p> <p>Solid: physically interactive, third place based.</p>	<p>Information, choice, and payment, are dematerialized, immediate, and ubiquitous, as they are staged from the virtual platform. Hives require no fixed attachment from members, nor from suppliers, nor even from the <i>Ruche-Mama</i> platform, which invests minimally in hives. Distributions are ephemeral and occur in third places which otherwise serve entirely different purposes.</p> <p>Suppliers, members and hive-managers meet physically. Third places hold specific material-cultural attributes and identities, which reveal which place types most facilitate AFNs and food prosumption. Albeit ephemeral, these places are essential since they are the physical facilitators of the digital food provision.</p>

Table 4. Proposed conceptual update of prosumption based on three intertwined dimensions: customization, transparency, and liquid-solid duality.

** Adapted from Bardhi and Eckardt (2017).*

The first criteria, *Customization 2.0*, is designed to conceptualize the growing need for advanced information and signs of distinction and quality that has become evident in the age of the digital prosuming society. The case of *Ruche* suggests that value is being driven through the four tensions around transparency and distinction (Section 4.4.1): integration (vertical, and at times horizontal), rather than segmentation; artisanship and human involvement, rather than industry; naturalness and sustainability, rather than artificialness; and distinction and identity, rather than standardization. These elements drive value, for the members of *Ruche*, because they collectively

generate greater trust, accountability, and meaning along the provisioning chain. These elements are particularly relevant to food as it has been the vanguard of this movement for the past thirty years, but can also be applied to goods in other sectors that are also subject to increased ethical scrutiny (e.g., vertical integration in textile; ethical distinction in minerals sourcing for electronics).

The second criteria, *Transparency*, is designed to conceptualize the rising ethos through which customization information and signs are funneled. Customization and transparency are therefore closely intertwined. This is made evident by the tensions between these: integration and artisanship facilitate control on ingredient or component origins and on processing techniques; while naturalness and distinction are qualities revealed by these modes of production. Although we separate customization and transparency here for conceptual purposes, they are two elements of one process of *transparent customization*.

The third criteria, *Liquid-solid duality*, acknowledges the important role played by the complementary, dual combination of virtual and material dimensions in building the devices that enable transparent customization signs and information to reach prosumers.

In introducing and empirically studying the notion of *digital food prosumption* by way of this case-study, we have proposed three intertwined criteria for a revisal of prosumption concepts. The dual informational medium which this type of virtual-material device permits appears well suited to the growingly complex sense-making which is now attached to the provision of goods and services in the age of informational ubiquity and sustainability concern.

6. Conclusion

This article has sought to create greater inroads between the emerging digital prosumer literature and the literature on alternative agri-food networks. We feel that the hybridization of food production and consumption can enrich both literatures.

We have found that prosumption is a particularly pertinent and useful concept to better understand Alternative Food Networks and the sustainable food transitions these seek to embody. *La Ruche qui dit Oui!*, a possible frontrunner in a new generation of hybridized AFNs which increasingly harness digital technologies, melds virtual-material flows and interactions into the flexible interstices of the urban fabric and in doing so, offers renewed modes and settings for active food customization, advanced food transparency, and interactive food exchange settings. These increasingly cognitive and interactive processes of food provisioning combine together with an aim to greater transparency and meaning, in the context of a global food sustainability crisis. These processes can usefully be subsumed into the wider concept of prosumption, a concept to which our

own proposition may also contribute with a perspective on a vanguard food phenomenon which is attached to a research area, AFNs, which has now been researched for three decades. There is also, however, much to be gained from the pursued intersection of alternative food and prosumption research, for two reasons.

First, prosumption research can benefit from further investigation of food, and more specifically, of AFNs. Food is an indispensable good and fulfills a wide range of physiological, social and cultural functions. In fact, food-related activities may be one core area of prosumption, because acts linked to food can be viewed both as acts of production and as acts of consumption, which come together around the dining table (Esposti 2014). In agrarian societies typical of the first wave in the architecture described by Toffler (1980), domestic production of food occupied most of human time. Societal critique of the second wave consumption-oriented, industrialized food provision systems, have renewed the primacy of the environment, health, rural development, food access and animal welfare. We have understood these to be new criteria for transparent customization. Prosumption focused on these criteria could contribute to making food systems more sustainable and just. Also, some sectors in food and agriculture now appear to incorporate new architectures and flows of digital data (e.g., social networks, big data, precision agriculture, blockchains, dematerialized food retail such as drives and e-commerce), which may contribute to intensify food prosumption, especially its virtual dimension.

Second, prosumption concepts may help to address certain remaining tensions in the AFN literature. One tension is the seeming contradiction between the improvement of producer livelihoods through value addition from advanced customization, and the imperative for wider access to quality food for disadvantaged social groups who lack financial resources or healthy or sophisticated food practices. A second tension pertains to the unequal geographies of food prosumption and the necessary further study of how AFNs, and the diverse third places that materialize them, spread within varied urban geographies and socio-economic enclaves. A third key question regards differences, or convergences, between distinct food families (e.g., vegetables; meat; dairy; etc.), which could be studied further from the perspective of such food prosumption practices. A fourth point concerns whether prosumption practices are more endogenous to the realm of AFNs or, on the contrary, if they are more endogenous to conventional food regime practices (e.g., product distinction through mainstream market segmentation strategies). Finally, further study is required of the new intermediations which the promises of improved food transparency seem to justify. *Ruche*, and other AFNs from the digital age, may be the prime illustration that the food sector is at the vanguard of these new intermediations and digital and material reconfigurations between practices of production and practices of consumption.

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APPENDIX A: List of Top 100 most frequent multi-terms for supplier product descriptions (in French)

Entity	Frequency	Nb of distinct documents	Entity	Frequency	Nb of distinct documents
SOUS VIDE	1941	1803	frais après ouverture	244	
agriculture biologique	1536	1490	matière grasse	241	
huile d'olive	1222	1035	boucher professionnel	228	
pommes de terre	1042	917	sucré de canne bio	228	
huiles essentielles	927	632	fruits rouges	226	
chocolat noir	828	559	Teneur totale en sucre	226	
MIEL DE	809	644	huile de tournesol	224	
plein air	689	669	poudre d'amande	224	
sucré de canne	646	614	qualité du produit	223	
farine de blé	632	618	fromage blanc	223	
pièce à l'autre	617	617	vinaigre de cidre	222	
chocolat au lait	557	356	commerce équitable	220	
LOT DE	509	493	fruits à coque	218	
Sans conservateur	500	496	extrait naturel	218	
atelier de découpe	482	482	INFORMATIONS COMPLÉMENTAIRES	217	
lait cru	475	464	Conseils de dégustation	209	
jus de citron	425	408	chocolat blanc	202	
Fabrication artisanale	425	417	huile végétale	202	
Pour une meilleure conservation	418	418	pomme jus	199	
lait entier	381	376	Herbe fraîche	198	
lait de vache	370	359	poudre de lait	198	
foie gras	369	339	Ingrédients issus	197	
vin blanc	355	340	meule de pierre	196	
jour de la livraison	348	348	produit chimique	193	
sachet sous vide	344	344	Bonne dégustation	192	
fèves de cacao	331	288	protéines de lait	186	
pur beurre de cacao	327	299	feu doux	185	
dégustation de nos produits	325	325	présence possible de fruits à coque	184	
meilleure conservation et une hygiène parfaite	323	323	fruits secs	184	
abri de la lumière	322	322	chaîne du froid	183	
sel et poivre	321	305	fromage de chèvre	176	
sortir du réfrigérateur	320	320	façon traditionnelle sans colorant	175	
techniques d'abattages	313	313	conservateur et sans huile	174	
Notre fonctionnement	313	313	herbe et au foin	173	
étourdissement dans l'Abattoir Communal	313	313	Origine France	166	
Abattoir Communal de Luzy	313	313	acides gras	165	
salle de découpe	313	313	emballage sous vide	165	
Sud Morvan	313	313	eau bouillante	165	
beurre de karité	309	258	arômes artificiels	164	
Poids net	303	298	piment d'Espelette	163	
huile de palme	303	262	saponification à froid	159	
lécithine de soja	298	291	Bon appétit	159	
questions le jour	297	297	beurre salé	159	
graine de lin	293	278	Conseil d'utilisation	158	
beurre de cacao	287	273	chocolaterie Paris	158	
température ambiante	269	267	Allergènes présents dans les ingrédients	158	
pain d'épices	263	211	gluten et arachide	156	
viande de porc	261	255	Canton de Luzy	156	
Valeurs nutritionnelles	259	257	fromage frais	154	
sel de Guérande	251	249	qualité de notre viande	154	

For presentation purposes, only the first 100 of the list of 500 selected multi-terms are on display here.

APPENDIX B: A sample of third places categorizations

NAME OF THE HIVE	ADRESS	MUNICIPALITY	POSTAL CODE	NAME OF THIRD-PLACE	TYPE OF THIRD-PLACE	THIRD-PLACE TYPOLOGY
Camping Le Soleil de Crécy	Route de Serbonne	Crécy-la-Chapelle	77580	Camping Le Soleil de Crécy	Campsite	UNCLASSIFIABLE
Beaugrenelle	12, rue Linois	Paris 15	75015	Centre Commercial Beaugrenelle	Commercial mall	UNCLASSIFIABLE
CHEZ LEMON TRI	57-59 RUE DENIS PAPIN	Pantin	93500	Chez Lemon Tri (centre de recyclage)	Recycling center	UNCLASSIFIABLE
Dans la Cuisine	54 - 56 avenue de France	Paris 13	75013	Dans la cuisine (restaurant « militant »)	Cafe-restaurant	CONVIVIAL
Dunois	77, rue Dunois	Paris 13	75013	Bar-brasserie Le Dunois	Cafe-restaurant	CONVIVIAL
Espace de Co-working NextDoor	92 avenue Charles de Gaulle	Neuilly-sur-Seine	92200	Espace de Co-Working Next Door	Co-working space	CONVIVIAL
Avenue du Général Leclerc	99 avenue du Général Leclerc	Maisons-Alfort	94700	Librairie Metropolis	Non-food shop (library)	CONVIVIAL / CULTURAL
L'Age d'Or	26 rue du Dr Magnan	Paris 13	75013	Bar Resto l'Age d'Or	Association and cultural cafe-restaurant	CONVIVIAL / CULTURAL / CULTURAL
Carreau du Temple	2 rue Perrée	Paris 03	75003	Carreau du Temple	Municipal cultural space	CULTURAL
Gaîté Lyrique	3 bis rue Papin	Paris 03	75003	La Gaîté Lyrique	Espace culturel municipal	CULTURAL
Rue des Irlandais	5 rue des Irlandais	Paris 05	75005	Centre Culturel Irlandais	Cultural center	CULTURAL
Cinéma Utopia Stella	1 place Mendès France	Saint-Ouen-l'Aumône	95310	Cinéma Utopia	Independent cinema	CULTURAL
Centre 72	72 rue Victor Hugo	Bois-Colombes	92270	Centre 72 Espace culturel citoyen en solidaire, Eglise protestante	Religious cultural space	CULTURAL / SOLIDARITY
Ferme des Vallées	chemin des vallées au veau	Auvers-sur-Oise	95430	Ferme des Vallées	Farm	SUPPLIER
RUEIL IBIS STELL	16 boulevard Stell	Rueil-Malmaison	92500	Hôtel Ibis	Hotel	MOBILITY HUB
Gare Saint-Lazare	13 rue d'Amsterdam - 1er étage, niveau quai en face de	Paris 08	75008	Gare Saint-Lazare	Train station	MOBILITY HUB
PLACE GASNIER-GUY - GARE	Gare de Chelles Gournay	Chelles	77500	Gare de Chelles-Gournay	Train station	MOBILITY HUB
Place de l'église	7 rue de l'église	Yerres	91330	Ecole Primaire Saint-Exupéry	School	MUNICIPAL
Place du Marché	12 place du Marché	Coulommiers	77120	Place du marché	Market square	MUNICIPAL
Rue des écoles	21 bis rue des écoles	Alfortville	94140	21 bis rue des Ecoles (à côté de l'Orchestre national d'Ile-de-France)	Individual housing	PERSONAL
Rue Lucien Boxtaël	59 Rue Lucien Boxtaël	Montigny-lès-Cormeilles	95370	59 rue Lucien Boxtaël	Individual housing	PERSONAL
Palais Royal	3-5 rue de Beaujolais - Péristyle	Paris 01	75001	Péristyle du Palais Royal	Public space (monument)	PUBLIC
Chemin de l'Écluse - Bord de Marne	Chemin de l'Écluse - Bord de Marne	Neuilly-sur-Marne	93330	Bords de Marne	Public space (riverbank)	PUBLIC
Chemin du Larris - Avenue du 8 Mai 1945	10 Chemin du Larris - Avenue du 8 Mai 1945	Étampes	91150	Pôle Economie Solidaire d'Etampes	Economic solidarity group	SOLIDARITY
CAP ESPERANCES	89 bis rue du 18 juin	Ermont	95120	Cap Espérance Centre de Formation Continue (organisme protestant)	Religious solidarity organism	SOLIDARITY

For the purposes of legibility, only 25 third places are displayed here (presenting, however, examples for each of the categories).