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Data: a long-standing resource for agency vs. concentration

The case of Swiss agriculture

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"More and more experts are living on our backs. The slightest mistake is immediately punished. And with all this paperwork, it is impossible not to have a cross ticked in the wrong place once in a while. If we were normal companies, we would all have at least a 50% secretary" (Philippe Gruet, Swiss farmer).

I. Introduction

Power relations may be installed around data and the way data-collection, -exchange and -valorisation are organised. Changes in this organisation may lead to modifications of the relations between actors, in particular in terms of the distribution of agency¹. We question the conditions, in the digital and analogical worlds, which can lead a group of actors to develop and maintain an agency based on data. The setting in which we develop these considerations is the Swiss agriculture (agriculture traditionally interacts with many sectors of society). Over the past thirty years, the use of reporting and controlling data, accompanied and driven by digital technologies, has exploded. Between 2015 and 2019, this "digitisation" of agriculture generated a great deal of excitement among stakeholders. Several initiatives were led, whose objectives clashed in terms of taking or defending power in the public or private sector. This paper reviews two of these conflicting initiatives in the agriculture sector: the effort to concentrate data in the hands of a few powerful actors and the reaction of a smaller group, among them professional organisations and farmers, aiming to regain the agency of the latter. The discussion of the potential of data in terms of agency is anchored in a historical perspective.

The paper begins with a short description of the fieldwork and the events we witnessed as an ethnographer, conducting her thesis, and as an architect and designer of a peer-to-peer platform, which will also be presented. We then take a historical step backwards on the issue of agricultural data, focusing on the agency of farmers as a group, represented by their umbrella union. A brief analysis of their relationship to agricultural data and the evolution of this relationship, in particular its erosion, allows us to demonstrate the marginalisation of the position of this group in relation to other actors in the sector and society. We conclude by examining some of the conditions under which this group of actors developed, maintained, lost and attempted to regain a data-based agency.

II. Fieldwork

a. A peer-to-peer platform vs. a centralised data warehouse

In 2015, a project to centralise all agricultural data was launched in the Swiss agricultural sector. At the heart of the debate was the administrative burden for farmers. The sector seemed to be unanimous: the disproportionate number of databases operated by various organisations controlling the production and activities of the agriculture sector generated a too heavy burden for the farmers who had to feed them with data. Farmers were "tired of entering the same data over and over again on different platforms" for the sector's

¹ By *agency*, we mean (in the classical sense adopted by social sciences though the notion is debated), the capacity of actors to act upon their environment, to transform or influence it. This concept has often been opposed to the notion of structure as a set of devices that influence or limit the choices and possibilities offered to the actor (thus acted, determined). We see in the concept of agency, above all, the opportunity to put in relation not the actor with the structure, but the actor with the network of actors. In other words, to put in relation capacities of action disputed between groups of actors.

public administrations, producer and certification organisations, umbrella organisations or even large-scale distribution (not to mention their own electronic "field books" or farm management applications, even if these were seldom mentioned). The project of data centralisation aimed to remedy this problem. It proposed to create a single data warehouse for the entire agricultural sector. A few months later, the warehouse evolved into a centralised smart farming platform. Launched by a large consortium² of private actors, backed by the federal government, the project was perceived by several organisations and farmers as an attempt to monopolise agricultural data. Not only would the solution threaten the autonomy and even the very existence of organisations, which depend on access to and management of this data, but it would also risk making producers captive to the initiative's promoters, who, having precise and complete visibility of the market, could then proceed to the "vertical integration" of farmers. At the end of 2017, three organisations³ decided to develop an alternative solution, which should be acceptable to all, the public and private sector actors, as well as the farmers. This solution took the form of a peer-to-peer platform designed to enable the exchange of agricultural data between organisations when authorised by the data owner, the farmer. By facilitating the flow of data, its promoters hoped to reduce the administrative burden of farmers and to support the innovation and digitisation of agriculture (i.e., the development of innovative data-based services, chosen by the farmer, to enhance the quality or traceability of their production).

The peer-to-peer platform's publicised objectives were similar to those of the centralised platform, but proposed a different framework, in which actors would retain their autonomy and act in a cartel-free market. Organisations would retain their socio-technical data collection systems and exchange data if they wished, playing both the roles of source and recipient (peer-to-peer). The farmers, via a mobile application for managing authorisations connected to the platform, would control the flow of their data between systems. A first prototype of the platform was operational in late July 2019⁴.

b. A digital cooperative in the hands of farmers

During 2018, the peer-to-peer platform project developed the concept of a farmer-owned cooperative to develop farmers digital data. With the peer-to-peer platform farmers had the ability to individually control the flow of their data between systems operated by different organisations. With the cooperative a more interesting aim in terms of agency gains was that farmers would have the capability to collectively drive digital developments themselves.

Connected to the peer-to-peer platform, and taking advantage of its decentralised configuration, especially in terms of data access and redistribution, (i) the cooperative would develop low-cost digital applications for the benefit of its farmer-members; (ii) a capital extension by subscription would finance each new application; (iii) the cooperative's data would contribute to the project; data accessible from other operators would be collected at the request of the farmers via the peer-to-peer platform; additional data would be produced by the farmers or purchased; (iv) the results computed by the application would be made available to the farmer, to the cooperative itself and to authorised operators; (v) third party operators would distributed the results to the farmers via their own applications, but without having to compute them (i.e., develop, operate and maintain the programs).

With this decentralised configuration, the cooperative would not need to develop a system to manage this data, nor specific front-ends, which would reduce its costs. Third-party systems would access value-added data without having to develop the programs. Farmers

² Initially a national agricultural centre for extension services and a company with a majority shareholding by the Swiss government, later joined by a federation of agricultural cooperatives, active in input trading, and a major buyer of agricultural products, a foreign software company, and several organisations active in the animal sector.

³ A producers-association, representing 30% of Swiss farmers under a label for sustainable production, a member-state of the Confederation (canton), and a large control organisation, itself unifying several producers-associations from the crop production sector.

⁴ For a brief description of the peer-to-peer platform, see the Appendix.

could access the data with applications they already knew and knew how to use (i.e., their trusted farm management software) without having to utilise an additional application that would compile a disparate collection of data calculated by the cooperative. All the added value of the data would be returned to the farmers (after discounting the costs of programs and a margin negotiated with other operators). The "market" for a new application would be based on an identified need and exist at the outset of a subscription-funded project, thus reducing the financial risks.

Since the governing bodies of the cooperative could eventually be tempted by centralisation and concentration of power to which other collective initiatives, e.g., on the Internet, have given in, the project leaders planned to include regulatory mechanisms in the cooperative's statutes. Each member could: i) leave the cooperative with his or her own data, and request its removal from the cooperative's system; ii) obtain a complete version of the source code of all the applications he or she had subscribed to, and the freedom to use it for his or her own purposes; and finally, iii) have the possibility to join another cooperative with the same goals and statutes as the original cooperative. Any modification of these conditions would require a change in the statutes, to be approved by a qualified majority of members, giving unhappy cooperants time to withdraw with their data and source codes before the change would take place.

By designing a "data collector", operated by farmers and organised in a digital cooperative, the initiators of the project foresaw a progressive reversal of the configurations of digital agriculture that had up to then reduced farmers to consumers dependant on big players who shaped it to their benefit.

So far, we have shown how the organisation of data collection, exchange and valorisation can affect the relationships between actors, especially in terms of agency distribution, from a mainly economic perspective. We now propose to approach a more political perspective by making a leap back in history.

III. Data: an old resource repurposed

Swiss agriculture experienced its first "datafication" at the end of the 19th century, when the Swiss Farmers Union (noted SFU), threatened by the rural exodus and the disappearance of peasantry, gradually introduced financial bookkeeping to farmers under the leadership of its director Ernst Laur. The collected data allowed to trace costs and revenues, debts, interests and paid salaries, profits, and the financial value of land. Collected and aggregated, the data also enabled to sketch sectoral trends and were used by Laur and the SFU to provide a scientific basis for the public policies and trade treaties they supported at the national and international levels. Moreover, they served to consolidate the union's power and counteract critics and dissidents within the peasant movement. While the "experts" aimed to modernise agriculture and make it governable through data, farmers saw it as a means to improve the management of their farms (productivity gains) and to participate in a symbolic exchange (accounting made them seem modern). They also believed that data would bring them benefits through collective actions.

Although Swiss administrations had been collecting data since the 1850s, the SFU established a long-term privileged position in the field of agricultural data because of the scope (both qualitative and quantitative) of its data. In the 1990s, however, the situation changed when the Swiss government abandoned its policy of price support (practiced since the 1950s), a decision which was driven by the liberalisation of trade in the final Uruguay round agreements that established the WTO (Marrakesh 1994). An income policy based on "direct payments" was introduced, in line with these agreements and in response to the growing debate and measures with regard to environmental and animal welfare issues. The introduction of direct payments intended to support a so-called multifunctional agriculture: an agriculture that no longer would only produce food, but also contribute to the "maintenance of the natural basis of existence, the maintenance of the rural landscape and the decentralised use of the territory" (article 104 of the Swiss Federal Constitution). This development was accompanied by the increased use of a large amounts of data, which were managed under the responsibility of the

Confederation and the cantons: data on persons and farm organisation, on surfaces, animals and labour, and on a series of contributions to the cultivated landscape, to food supply, to biodiversity, to landscape quality, to resource efficiency, to special crops, etc.

Initially provided by farmers on paper-forms and typed into the public administration's information systems by dedicated agents, these data were gradually entered directly into these systems by farmers with the widespread use of the Internet and personal computers. This "digitisation" became an opportunity for public administrations to transfer the data-entry workload to the farmers, and thus to collect and manage more and more voluminous and complex data. These data are still used today to distribute subsidies to farmers, to establish statistics, to determine future agricultural policies and to ensure food security.

Public administration had regained control of agricultural data through political changes linked to international developments. Even today, the leaders of agricultural organisations consider the federal administration of the government as the actor with the "best data". The Swiss Farmers Union still produces "statistics", but relies to do so on other organisations that collect data directly from farmers as part of their operational processes and services.

Beyond changes in the relative position of actors in relation to data, this "hi-story" illustrates the political stakes of access to data, even in times when data were still analogical. It also narrates the transformations of the relationship between farmers and agricultural organisations. When data collection was controlled by the SFU, the workload of farmers to supply data had a direct return in terms of profitability on the farm, as well as a symbolic gain, additionally to an increase in agency of the profession. When the state took control of data, supplying data by farmers was transformed into administrative work, remotely connected to their day-to-day concerns, and became increasingly burdensome, especially when new types of direct payments were introduced or old ones were adapted. This evolution was also accompanied by a fundamental change in the representation of the farmer's profession: from "entrepreneurs", as they had considered themselves until then, they became "civil servants", receiving a cash salary based on the quality of their administrative work.

Farmers increasingly complain about this transformation and growing formalisation of the profession. They blame the state and other agricultural organisations for requiring data in exchange for the possibility to get a premium on their products, e.g., as for certified organic or "integrated" production. Farmers can be penalised for errors (bad data or poor results in controls), which also generates strong tensions. The consortium of private actors, associated with the smart-farming platform, used these grievances to promise a simplification of the administrative work thanks to a centralised data warehouse (note that they did not promise a simplification of administrative measures, nor a reduction of the data collected, but only a simplified data entry process). The introduction of smart-farming in parallel to the warehouse concept was presented as a return to the core profession of farmer, exercising modern agronomic skills and using modern digital technologies (in which, by the way, the promoters of the smart-farming platform had business interests).

But farmers didn't buy the argument. They resented the fact that the national federation of agricultural cooperatives was a large shareholder of the warehouse project. This "cooperative" already enjoyed a quasi-monopoly upstream and downstream of the production chain and did not hesitate to exert pressure on prices. Farmers feared that to give the platform's corporate shareholders control over all the sector's data, including the details of their operations, would transform them into "labourers" through an increased verticalization of the sector.

The people in charge of the peer-to-peer platform and the digital cooperative project had a different vision of the role to be played by (small) operators and farmers in the network of actors. The cooperative in particular, in addition to aiming to enable farmers to pilot digital developments, was envisioned as a tool to test statistical models and economic policies conducted by the state: providing the farmers the power to determine themselves what data to collect, what hypotheses to test, and what models to apply to that data. Just as the Swiss

Farmers Union and its director Laur did in the early 20th century with the paper-based accounting data.

IV. Conclusion

As the use of accounting and statistics by the SFU shows, political and economic issues around agricultural data had already been recognised in practice long before the advent of digital technology. Our fieldwork suggests that these issues may not only still exist today in relation to the use of data, but that the very control of data may become a major issue.

The stories of the Swiss Farmers Union and of the more contemporary digital cooperative both tell of attempts (successful in the first case and lasting eight decades) by a group organised as a collective to gain some agency based on data. What parallels can we draw between the two stories and what do they inform us about the conditions under which a collective of actors can acquire agency through data and maintain it over the long term?

1. *The perception of an existential threat (the disappearance of peasantry) motivates the search for a data-driven rescue solution.* The SFU was concerned about the rural exodus (farmers leaving the countryside to become “workers” in factories). The producers-association, at the origin of the peer-to-peer platform and the digital cooperative, was concerned about the threat that the centralised data warehouse would increase vertical integration, turning farmers into “labourers”.

2. *The solution, which is part of an enterprise to salvage peasantry, requires in both cases the active participation of the members of the collective.* The SFU sought to modernise farm management methods and increase productivity, but in order to do so, farmers needed to keep accounts. The nowadays producers-association sought to simplify the administrative burden of farmers and lower their costs, while giving them back control on their data and data-driven added value. This required farmers to manage the flow of their data with authorisations on the peer-to-peer platform and to subscribe to the development of applications in the cooperative.

3. *The solution based on collective action, provides not only collective value but also direct value to its individual users.* Quantifying problems with the help of SFU's bookkeeping helped develop and assess targeted corrective measures on the farm. Digital programs developed by the cooperative aimed to support the decision-making processes.

4. *A governance structure is bound to the solution and supports collective action.* This framework was legally defined in the case of the SFU, which was mandated by the government to produce statistics and contribute to the definition of agricultural policies. It was both technical and legal in the case of the cooperative. The cooperative's legal framework was provided by statutes and goals establishing the farmers' control over their data and their source codes. The peer-to-peer platform was the technical foundation of the cooperative and integrated governance mechanisms into its architecture, notably through the management of distributed operational data. Its legal framework was an agreement on the conditions of data exchange.

Are there other situations in which an organised group has acquired or attempted to acquire data-based agency? Can we gain observations and insight similar to ours from these situations, or other observations? Are there other situations in which a group succeeded in developing an agency *without* following a model of concentration and centralization (such as that of the smart farming platform, the “GAFAM” models or the dominant model of public instrumentation)? What conditions, observed or hypothetical, could allow a group of actors to sustain their newly acquired agency or to recover agency? These questions, formulated from our field observations, deserve to be discussed in relation to the experiences of the workshop participants.

Lausanne, 10 June 2021

V. References directly related to the topic

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VI. Appendix

The Peer-to-Peer Platform's Operating Model

The solution is fully distributed and consists of a set of "nodes" that communicate over the Internet, each of which is the anchor point for a single organisation in the peer-to-peer network. The node supplies all the elements necessary for the authorised transmission of data to or from its attached organisation. The platform has no components other than these nodes.

Each organisation operates and controls its own node together with the application programming interface (API) that connects the node to the organisation's data infrastructure. The API is independent of the *data's formats and structures*. It provides the organisation with functions to notify its peers that it has data available for transmission and/or to express its willingness to receive data. The solution works in the same way for all peers, each of which can be both sender and receiver of data.

Transmission between a sender and a receiver is direct and no third party has access to the exchanged data. Before starting to transmit a dataset, the sender publishes a description of the data it is making available. Peers interested to receive that data subscribe to that dataset publicly using the platform. Subscriptions do not concern a particular farmer, but all the farmers whose data are managed by both the sender and the receiver.

The farmer chooses the receivers and authorises the sender to transmit his data to them using a mobile application. An authorisation concerns two peers (a sender and a receiver), need not be symmetrical, and is managed exclusively by the nodes of these two peers. The authorisation can be updated at any time by the farmer and applies to all exchanges of this dataset between the given two peers until it is revoked.

A mechanism called data segmentation is used for data description by the sender, subscription by the receiver, and authorisation management by the farmer. It provides a way for N peers to transmit data to each other without using a predefined format or data standard. Peers do not need to agree on data formats beforehand and can avoid having to adapt their databases or applications just to communicate data. The different temporalities of the actors involved (farmer, sender and authorised receiver) and their mutual asynchrony are respected in the sequencing and securing of operations.

Authorisations and traces of data transmissions between peers are recorded using operational data in each node involved in an exchange and only in these nodes. The local tracing of exchanges, synchronised between the nodes of the peers involved, provides an instrument of proof and, conversely, an instrument of distributed control to identify an organisation that would not be following the rules (e.g., transmitting data without authorisation).

Finally, the principles of governance of the platform are registered in a collective agreement between farmers and database operators. This instrument defines a legal framework that can be revisited and adapted regularly to the evolution of the sector's data management needs.