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► **To cite this version:**

Oriane Lafuente-Sampietro. Convertible local currencies and localisation: findings from a user survey and network analysis of local French currencies. 2021. halshs-03324630

HAL Id: halshs-03324630

<https://shs.hal.science/halshs-03324630>

Preprint submitted on 23 Aug 2021

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Convertible local currencies and localisation:
findings from a user survey and network analysis of local French currencies

Oriane Lafuente-Sampietro¹

Abstract:

This article will investigate the links between convertible local currencies (CLCs) and economic localisation. Following on the qualitative study by Marshall and O'Neil (2018), we will answer the following question: to what extent do convertible local currencies foster the localisation of procurement and production by creating new commercial relationships between businesses that use them?

We will use data from a quantitative survey conducted by the *Mouvement SOL*, a French network of CLCs, for individual (n=1597) and provider (n=542) users of French CLCs. We will also address how new providers are found through the currency and analyse the change in consumption and production practices. This first analysis will be supported by a case study on the Eusko, the largest convertible local currency in France. The Eusko case makes it possible to cross-reference the survey data from Eusko users with the transaction data from digital Eusko users in order to evaluate whether the results of forming commercial relationships between companies are consistent across both sources. We will also use digital Eusko transaction data to run a network analysis, enabling us to observe the development of commercial relationships inside the community over time. We found that between one fourth to one third of businesses in a CLC network find new business partners in their CLC community, connecting with 3.5 new partners on average. These results are more encouraging than the absence of localisation found by Marshall and O'Neil (2018).

Transaction data also allows us to determine which sectors benefit the most from the circulation of CLC and thus draw a conclusion on the capacity of the currency to move from the localisation of procurement to the localisation of production. Our results on this point are more balanced. The retail sector benefits the most from the circulation of Eusko and actors in this sector exchange 40% of the CLC received into national currency, limiting the flow of income exchanged within the CLC.

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1. Introduction

Alternative currencies that circulate alongside national currencies with the objective of promoting socio-economic transformations have been gaining momentum since the 1980s (Blanc 2018). Their emergence has given rise to a vast literature on monetary plurality, citizen appropriation of money and the development of communities around monetary institutions.

Convertible local currencies (CLCs) are a specific type of parallel monetary instruments. They are distinct in their issuing mechanism and their goals of developing a more sustainable local economy. CLCs are issued by users exchanging national currency for a CLC at a fixed exchange rate (Blanc, 2018). The national currency exchanged for a CLC is for the most part kept in a reserve fund to allow users to convert their CLC back to national currency, under specific conditions. CLCs are created by groups of citizens, local governments or non-profit organisations to circulate within a community of businesses and citizens who accept it as means of payments in a given area. CLCs appeared in North America in the 1990s and have since then spread around the globe, notably in Brazil and France where these schemes are quite popular. Blanc, Fare and Lafuente-Sampietro (2020) have identified 82 CLCs in France in 2019, which accounts for virtually 30% of French municipalities. While these projects comprise a hundred businesses and between 200 to 400 individual users on average, they are highly diverse in size and structure.

CLCs also highlight specific goals among alternative currencies. While mutual credit systems, for example, mainly focus on the creation of social relations through exchanges or the transformation of value scales, CLCs also pursue the promotion of a more sustainable economy through the localisation of economic activities, i.e. the development of local procurement and production, amongst other initiatives (Michel and Hudon, 2015, Blanc, 2018). The localisation of economic activities positively correlates with sustainability, at least at a regional level (Olivier et al., 2018). For example, it allows to reduce harmful gas emissions due to transport, even though these benefits may be counterbalanced by higher energy costs due to small-scale production (Sundkvist, Jansson and Larsson, 2001). It also fosters the resilience and autonomy of the territory by reducing its economic dependence on global markets and contributes to the development of a domestic economy that meets the needs of the populations living in the territory (Talandier, 2013). By working as a constraint for their users, CLCs should strengthen the localisation process under certain conditions (Dittmer, 2013).

Michel and Hudon (2015) conducted a meta-analysis of studies on alternative currencies to clarify research advances in this area. They employ Seyfang and Longhurst's (2013) typology of alternative currencies that groups together CLCs with non-convertible local currencies under the label of local currencies (LCs). Of the 42 robust empirical studies identified by Michel and Hudon (2015), only 10 studies focus on LCs without specifically addressing the issue of economic localisation. Some studies, especially those on currencies implemented in impoverished territories, find positive effects of LCs in supporting business activity and developing the local economy (Ruddick, 2011; Carvalho de França Filho, Scalfoni Rigo and Torres Silva Junior, 2008), while others doubt the real capacity of LCs to contribute to the development of an entire territory, given the still limited scope of the schemes (Fare, 2012; Krohn and Snyder, 2008). In our opinion, if the size of the schemes limits the possibility of measuring their effectiveness at the scale of an entire territory, the effects should be investigated within the user community, including analysing the mechanisms that link CLCs to economic activity. In this article, we therefore focus on the specific part of these mechanisms: the localisation process. Although this issue has already been addressed theoretically (Blanc and Fare, 2018; Fare, 2016), there have been few empirical studies to measure the extent of the phenomenon.

Marshall and O'Neil (2018) provided a first study focusing on the issue of localisation based on a field study of the Bristol Pound, the largest CLC in the United Kingdom. They conducted 27 business interviews and consulted with economists and localisation specialists. They concluded that the Bristol Pound was not an efficient tool to enhance localisation, as businesses mostly used it with already known suppliers.

In this article, we expand this qualitative study with quantitative data. We focus our research on the Marshall and O'Neill's (2018) first two research questions: do CLCs foster localisation by creating new commercial relationships between businesses using them and if so, does this localisation of procurement contribute to the localisation of production?

To this end, we will use two sources of data: data from online surveys and transaction data from CLC users. The *Mouvement Sol*², a French network of CLCs, conducted a national survey of individual (n=1597) and provider (n=542) users of French CLCs. We will also address how

² The *Mouvement Sol* is a French non-profit organisation bringing together 31 non-profit organisations that manage CLCs. Its purpose is to help them to develop and promote cooperation and shared practices, lead joint projects and lobby for them at a national scale.

new providers are found through the currency and the analyse the change in consumption and production practices. The first analysis will be supported by a case study on the Eusko, the largest CLC in France. The Eusko case makes it possible to cross-reference the survey data from Eusko users with the transaction data from digital Eusko users, in order to evaluate whether the results of forming commercial relationships between companies are consistent across both sources. The transaction data analysis also enables us to conduct an in-depth investigation of both the localisation and procurement of production.

Our main finding is that between one quarter to one third of the CLC member companies find new suppliers or service providers within their CLC community. This figure is more encouraging than the findings made by Marshall and O'Neil (2018) that indicated no new business connections.

First, we will introduce the theory linking CLCs and economic localisation (2) and then present our methodology (3). Our findings on procurement and production localisation will be presented in the fourth section (4) and discussed in the fifth and final section (5).

2. Theoretical framework: localisation and convertible local currencies

The concept of economic localisation involves a multifaceted production, procurement, consumption and distribution process (Frankova and Johanisova, 2012). Despite its multidimensional aspect, one of the reiterated characteristics of localisation is to 'maximis[e] the local as opposed to the global supply of goods and services' (Oliver et al, 2017: 474). We therefore have chosen to focus our research on two aspects of localisation: local procurement and local production, factors that were also retained by Marshall and O'Neil (2018).

Local procurement involves the choice of various stakeholders to favour local suppliers for their consumption, production input or investment. Selecting local providers does not necessarily lead a proportional increase in local production. In fact, some local service providers may be retailers that sell non-local products. In this context, the local added value only applies to the sales service and not the production of goods, which takes place outside the region. Supporting local retailers with no ties to multinational groups helps limit the leakage of added value to distant economic spheres. However, unless shops commit to promote locally produced goods, this only marginally contributes to the development of the territory's economic diversification and thus to its autonomy and resilience. For this reason, the localisation of supply cannot be considered to be completely independent from that of production.

By attracting a sufficient number of local companies, CLCs seem to have a potential to foster the localisation of procurement (Dittmer, 2013, Seyfang and Longhurst, 2012). By creating a closed and restricted monetary circuit, CLCs have a marked effect on the spending orientation of the income acquired through it. On the one hand, income received in national currency can be used to procure goods and services produced and distributed by any other national or international actor. On the other, income received in a CLC has a more limited possibility of use. Units obtained in a CLC are often impossible to convert into national currency for individuals and are expensive to convert for businesses, due to either the application of a conversion rate or simply the implicit cost of the conversion process. Therefore, it stands to reason that earnings obtained in CLC will be used more within the user's local community compared to earnings obtained in the national currency. This restricted scope forces users to look for businesses within the community to meet their needs and thus encourages the establishment of new trade relations, replacing former ties outside the network. As a result, the consumption of locally produced goods and services can be increased. Moreover, aside from the personal choice to buy from local businesses, the use of the CLCs transfers the constraint to consume or to be supplied

locally to the trade partners and thus drives the transition from a personal constraint to a collective constraint (Fare, 2016; Blanc, 2007). This collective constraint is also promising in terms of the capacity of CLCs to transition from the localisation of procurement to that of production. Indeed, even if consumers spend CLCs with a non-producing seller, the latter is forced to use the CLC with other users. This may encourage sellers to meet new local producers to buy their products and thus encourage the localisation of supply and production chains.

However, and this is one of Marshall and O'Neil's (2018) conclusions, should a company only use a CLC with companies it previously traded with in national currency, it only substitutes national currency with a CLC and therefore does not promote localisation.

Furthermore, in order to have effective new relations within the network for the localisation of procurement, relationships must be established with firms outside of the region rather than local firms that are not affiliated with the CLC initiative.

Nevertheless, providers and businesses that accept CLCs as a means of payment are local actors chosen by non-profit organisations managing the schemes, based on criteria such as their involvement in the region's economic life or their commitment to environmentally-friendly production practices. These criteria are set out in charters drawn up by the members of CLCs that new users must sign upon joining the scheme (Blanc and Fare, 2016). The creation of supply chains in the monetary community aims to not only support local actors, but specifically those selected for their sustainable economic practices (North, 2005). As such, if CLCs facilitate the development of supply chains within their community, even at the expense of other local actors, they promote growth in a selected sustainable economic community.

The rigorous selection of participating businesses is also promising for the shift from the localisation of procurement to production, as businesses selected by the CLCs must commit to collaborate with other local actors, especially local producers whose products they can resell.

3. Methodology

3.1 Descriptive statistics of providers and individual user surveys

The *Mouvement Sol*, a French network of CLCs, conducted a social utility assessment which began in October 2019 and was published in March 2021. This study is a collective work by a dozen volunteers and employees of CLCs, the coordinator of the *Mouvement Sol* and two consultants, myself included.

First, the group had to design the structure of the study and its direction. It then had to define what the social utility of CLCs could be across different categories and finally develop the indicators for measurement purposes. The selected categories were the local and real economy, territorial dynamics, solidarity, ecology and citizen empowerment, with the concept of resilience as a cross-disciplinary value. They drafted three surveys for individual users, providers and non-profit organisations managing CLCs.

The surveys were sent to the 31 non-profit organisations managing a currency affiliated with the *Mouvement Sol* and to other unaffiliated volunteer CLCs, in an effort to reach their users. The surveys were launched on May 26, 2020 and were open for completion until October 25, 2020.

The individual users survey garnered 1,597 responses distributed across 50 CLCs and the providers survey received 542 responses across 37 currencies.

To consolidate the data, we compared the number of respondents by CLC to the number of estimated members based on their answers to *Mouvement Sol* survey, or on the CLCs inventory survey conducted in 2019 by Blanc, Fare and Lafuente-Sampietro (2020). This data was only available for 43 out of the 50 currencies declared in the SOL survey, accounting for 91% of respondents to the user survey with an estimated response rate of 6.4%. In order to consolidate the data, we chose to only keep the responses from members of CLCs whose response rate was above 5% or whose respondents represented more than 3% of the total survey respondents. Consequently, we retained the responses of the members of 24 currencies out of 50, accounting for 90% of the respondents (n=1417) with an estimated response rate of 9.4% (Table 2).

We proceeded in a similar way for respondents to the providers survey. We were able to calculate the response rate for 34 of the 37 CLC respondents, comprising 98% of the responses with

an estimated response rate of 2.6%. When restricting the data to only respondents from currencies with a response rate greater than 5% or representing more than 3% of the total respondents, we obtained a sample of respondents concentrated across 18 CLCs with a response rate of 13.5%, corresponding to 91% of all respondents (n = 492) (Table 2).

In this article, we will conduct an in-depth analysis of the Eusko, the CLC of the Basque Country. We also have transaction data for this CLC. 203 individual users of Eusko responded to the SOL survey, which corresponds to a response rate of 5.3%. 127 Eusko corporate members responded, accounting for 12.7% of the companies belonging to the currency.

Table 2 – Sample selection for the two surveys

	Individual users	Providers
Initial sample	1,597	542
<i>Number of CLC</i>	50	37
<i>Estimated response rates</i>	6.4 %	2.6 %
Restricted samples	1,417	492
<i>Number of CLC</i>	24	18
<i>Estimated response rates</i>	9.4 %	13.5 %
Eusko	203	127
<i>Estimated response rates</i>	5.3 %	12.7 %

The methodology used to analyse this data is based on descriptive tables from the respondents' answers. The survey asks providers and individuals about how they find new suppliers within their CLC community, how they search for them and how they use the tools offered by the CLC to help them in this process. Our methodology suffers from three main biases: respondent self-selection bias, the unavailability of a control group and measurement bias due to self-reporting. The self-selection bias arises from a lack of representativeness of the respondents, i.e. those who voluntarily chose to answer the survey compared to all CLC users. Thus, it is possible that only the most involved users took the time to answer the survey and that the aggregation of their answers may lead to an overestimation of the real effects of CLCs. However, the results obtained show a great diversity of respondents, both in their socio-demographic profiles (Appendix 1) and their strong involvement in the project (Appendix 2). While the representativeness of the sample is difficult to determine due to the absence of information on the surveyed

population, one can still conclude rather positively on the heterogeneity of the represented profiles.

Due to the absence of a control group, it is also not entirely certain that the new commercial relationships between members of the CLC are a direct result of the currency. Thus, it is possible that partners belonging to close social networks would have met and started to exchange even in the absence of the CLC. However, the survey asks questions about the use of the tools provided by the CLC to facilitate the development of commercial relationships between its members. This makes it possible to control for the importance of membership in the CLC in the actors' decision-making processes. While this limitation to our methodology is significant, the selection of a relevant control group to measure the supplier selection practices of companies outside the CLCs with a similar profile seems particularly complex, as does their compliance to the survey.

The last bias comes from the quality of the measurement itself. Given that the survey is declarative, individuals may underestimate or overestimate their selected suppliers resulting from their CLC membership. This issue in quality of the measurement is partly compensated by using a second data source: the Eusko transaction data. This direct source helps to control the quality survey results.

3.2 Analysis of transaction data

The transaction data used to underpin the results of the survey is the user data from the digital version of Eusko. Digital Eusko has been available for providers since 2014 and was made available to all users in 2017. The database therefore contains all the operations carried out by members of the CLC via the digital system, including transactions, the exchange of euros into CLC, reconversion or withdrawals of scriptural currency into banknotes and the deposit of banknotes into scriptural currency. The database contains 156,081 entries, including 69,020 transaction entries. In 2019, 28,097 transactions took place in digital Eusko, of which 3,478 were between companies in the network, with an average transaction amount of 290 euskos.

Table 3 – Transaction data in 2019

	2019	2014-2019
Number of member businesses	1,003	Unknown
Businesses with a digital account	488	488
Businesses involved in B2B relationships	378	407
Businesses that have received payments from individual users	244	326
Number of transactions:		
B2B	3,478	6,793
From individual users to business	24,006	41,707
Average number of payments received:		
From other businesses	7.2	8.8
From individual users	49.4	58.2
Average payment amount:		
From businesses	290	331.8
From individual users	23.8	24.4

To process the transaction data, we applied methods from network analysis to investigate the creation of business relationships between CLC firms (Isifidis et al., 2018; Fraňková et al., 2014). For each Eusko firm, we counted the number of incoming and outgoing connections, i.e. the in and out degrees of the network nodes and the strength of these relations. We observed their deployment over time and the integration of new companies into the network, as well as the evolution of its density.

Additionally, we analysed the practices regarding the use of CLC by sector in order to investigate the capacity of CLCs to effectively localise production and not only procurement. This was performed by observing the sectors receiving the largest volumes of CLC and their capacity to circulate it.

These analyses complement the survey results by examining whether the orders of magnitude obtained are similar. However, this data also suffers from limitations. The transaction data does not provide information as to whether business-to-business (B2B) relationships can be classified as new. It is therefore possible that the B2B relations recorded in digital euskos existed before the use of the CLC by the actors and that the use of the eusko is simply a substitute payment method. However, the SOL survey question concerned only the meeting of new suppliers or service providers.

4. Findings

4.1 Localisation of procurement

In the SOL survey, 33% of the 447 companies responding to this question stated that they had established new relationships with suppliers or providers in the CLC since they started using it. This figure rises to 41% for Eusko members. This first result paints a rather different picture to the results found by Marshall and O'Neil (2018) and shows that CLCs seem to facilitate new business-to-business relationships in their community of users. On average, these business professionals had established ties with 3.5 new member companies of the CLC. This figure increases to 4 for companies using Eusko.

When comparing these first results with the results from the Eusko transaction data, the outcomes differ slightly, although the orders of magnitude remain similar. Of the 1,003 Eusko companies in 2019, only 488 had a digital eusko account. 378 had been involved in B2B transactions in digital currency and 267 made at least one digital payment to other companies in the network between 2014 and 2019. As such, if we compare the number of companies that have already used digital Eusko to pay a B2B transaction ($n=267$) with the total number of companies at the end of 2019 ($n= 1,003$), at least 26.6% of the companies in the Eusko network have effectively paid a supplier in Eusko over that period. This estimate is well below the 41% of businesses in the SOL business survey that reported having found new suppliers or service providers in the network. However, this figure is the minimum estimate as only 488 Eusko companies had a digital account at the end of 2019, less than half of the total. The Eusko circulates in a mixed format, in both digital currency and banknotes. Therefore, it is highly likely that other transactions between companies took place via the exchange of banknotes and left no digital trace.

On average, companies used digital Eusko as a means of payment with 2.3 other companies in the network, if we exclude both their relations with the organisation managing the currency and the organisation itself from the average. If we only include the companies that have used Eusko to pay other companies, the average increases to 3.6 business relations per company. This indicator is highly consistent with the statistics obtained in the SOL survey. Exchanges within each pair of commercial relations took place 4.8 times on average, for a total average amount of 1,796 euskos from 2014 to 2019. There is strong variability both in the frequency of exchanges within the pairs and the total amount exchanged, which varies from 0.5 to 115,988 euskos.

Turning to the procurement of individual users, 17.5% reported frequenting new providers since using the currency and 38% reported having done so a few times. 14% of individual users (24% of Eusko users) reported frequenting small local shops much more than before and 32% did so a little more than before. 25% declared that they gave high priority to professionals using the CLC and 41% report that they did so occasionally.

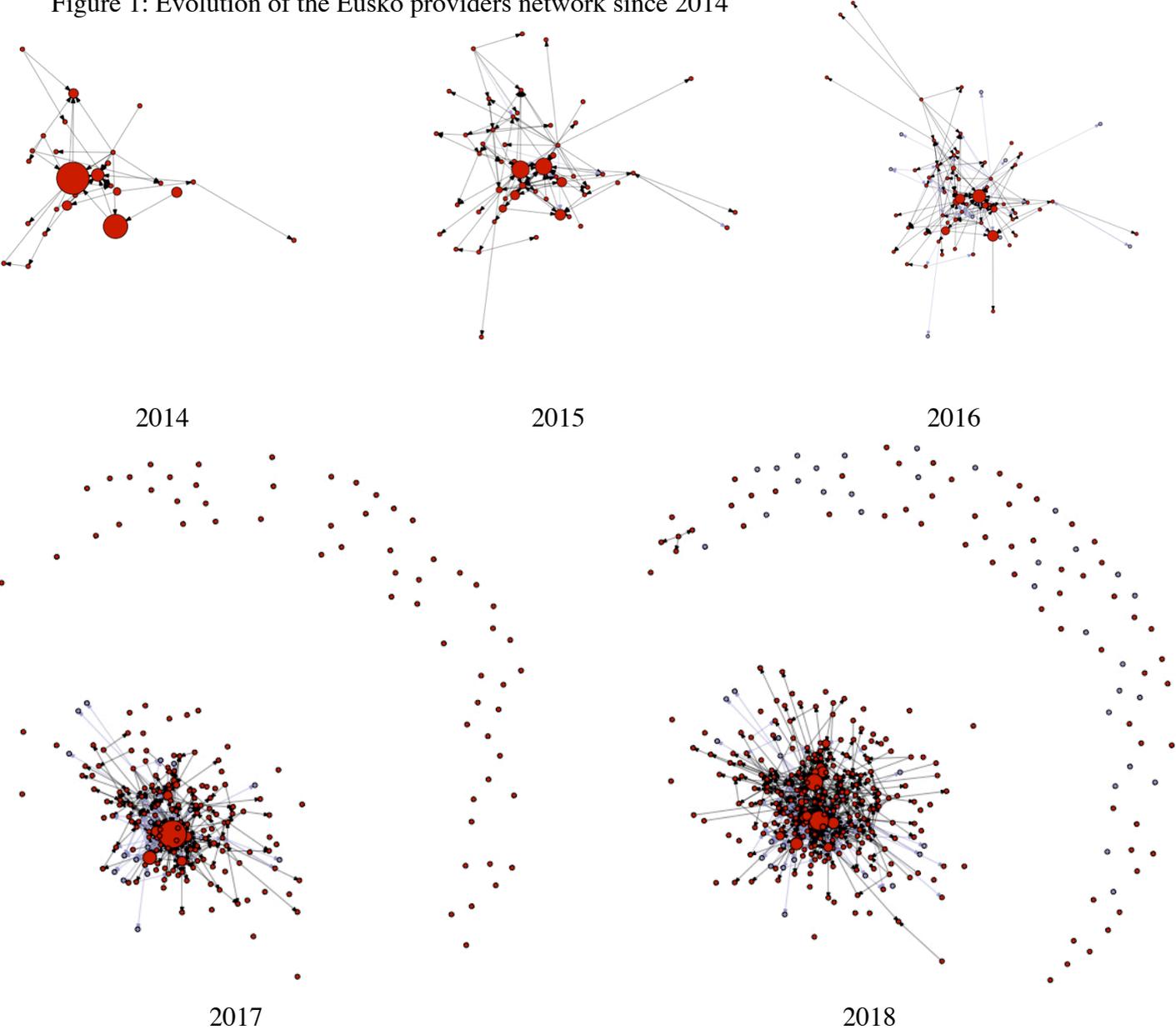
As mentioned before, one limitation of this descriptive analysis is its inability to concretely determine the part played by the CLC in the development of new B2B relations. It is possible that the two partners would also have met in its absence.

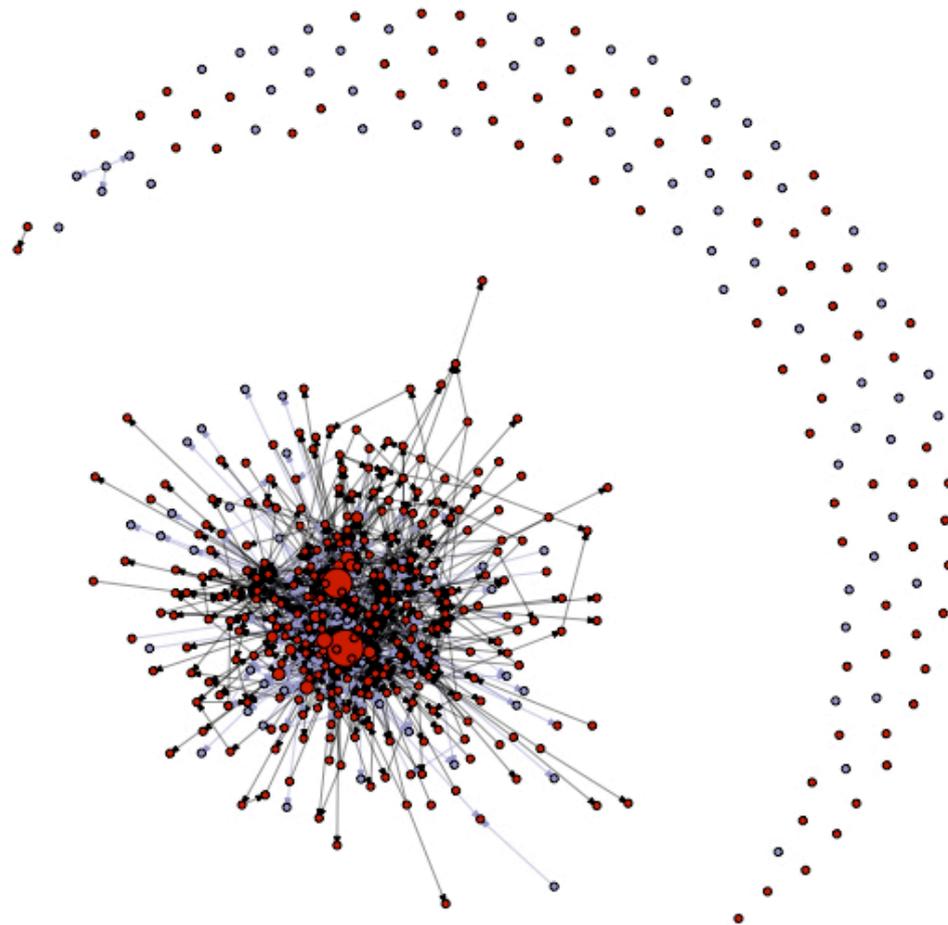
To partially control for this aspect, the survey includes questions on the efforts made by the management organization to connect companies. The vast majority of organisations help their users get in touch with each other through member directories of providers. 30% of companies report that they often use the directory to search for new suppliers or service providers and 36% declare that they have already done so a few times. 27% of individual users also state that they frequently use the directory to look for new suppliers, and 41% consult it occasionally. 76% of the business declaring new suppliers in their CLC network sometimes or frequently use the directory, which reinforces the idea that the CLC plays a role in creating new contacts. Some associations also hold networking events for their business members and 30.7% of providers reported having participated in this type of event. 15% of the respondent companies also stated that they had frequently chosen a CLC member provider over a non-member when searching because they accepted the currency, and 15% stated that they had done so a few times. These proportions increase to 27% and 29% for individual users. Thus, CLC users appear to be involved in the community of exchange and use the tools offered by the currency to develop their providers networks and the acceptance of a CLC is a factor when choosing a supplier.

We performed a network analysis on the transaction data to obtain a visual representation of the network development to observe how the number of connections between firms grew over time (Figure 1). Figure 1 features only businesses that have received or made a payment using digital Eusko, the non-profit organisation managing the scheme is not included, because the network would have been too centralised in its presence as almost all businesses have a payment relation with it at least for their membership fees payments. Change over time is cumulative and connections from previous years remaining are mapped as arrows. Active points of the year are shown in black and the non-active are shown in grey. Each point is a company belonging to

the network. Companies that have participated in at least one eusko digital transaction are displayed in red, those that have been active in previous years but are inactive in the given year are displayed in grey. Isolated points, with no arrows linking them to other points, are companies that have received payments from individuals -who are not represented in the network- but have never received or issued payments in digital Eusko from or to other companies. These stakeholders are represented in 2017 when the digital Eusko was made available to all users. Companies that have only had transactions with the managing organisation Euskal Moneta are not represented.

Figure 1: Evolution of the Eusko providers network since 2014





2019

Digital B2B payments were launched in 2014 and only few companies were using the digital scheme at this time. The payment process for these companies involved receiving payments in Eusko from other companies, changing euros into euskos, or depositing euskos banknotes received from their customers into their digital accounts before making transfers. The latter two operations generate high transaction costs, as they are costly in terms of time and organisation. Therefore, it is probable that most companies opted to use eusko banknotes received from individual consumers or even euros in their transactions with other companies. At this time, only 14.7% of the registered companies used the digital platform for payments and 26% of the companies participating in digital B2B operations only received payments and issued none. The average degree of external connection is 1.6 (Table 5) and two companies account for most of the exchanged volume. In 2015, new companies joined the network and the number of stakeholders doubled. The transaction volume is still very concentrated, but during this period there

were five particularly active and prominent stakeholders. 38% of companies only received payments and made none, however the average external degree rose to 2. This shows strong involvement by some actors using the currency with others and therefore creating high degrees of connection, while most companies are only receivers. In 2016, new actors entered the network, while previous users stopped exchanging. Consequently, some companies with a low transaction volume in 2015 turned grey, reflecting a lack of integration and a drop in their use of the facility.

The introduction of digital Eusko for individuals in 2017 caused a sudden influx of payments from them to businesses, multiplying the numbers of digitally active businesses by 3.9. This rapid increase in network size is reflected in its density, i.e. the number of observed connections divided by the number of potential connections, which is divided by almost 10 between the period before and after 2017 (Table 5). The average degree also fell sharply: in 2017, 59% of the companies that received payments never used euskos to pay other businesses. Companies that are disconnected from each other appear in the crown graph. These companies received only small amounts of digital currency from individual users and did not use euskos to make payments to other firms. It is likely that some of them received euskos banknotes on the side and traded with other firms in this form. Their complete separation from the rest of the network may therefore be misleading.

The central players in terms of volume of transactions maintained or expanded their position in 2017. Some of these companies sell corporate equipment that is relevant to many business activities. As such, they can serve the needs of many businesses, and it is likely that new entrants seeking to use their digital CLCs will turn to them. The arrival of consumers, provided they do not completely disrupt the hierarchy of exchanged volumes, increases the scope for other types of activities, such as food outlets.

The connections of new actors to the main connected group is graphically observable between 2017 and 2019. Companies that now receive digital euskos because they have been selling goods or services to individual users can use them more easily for their own payments to other companies. However, it is possible that the new digital transactions may have replaced previous transactions in eusko banknotes. Making digital payments available to all users has also been complemented by a monthly automatic exchange via direct debit for individual users, which caused a sharp increase in the money supply and transactions in euskos, particularly from individuals to businesses. It is therefore highly likely that companies have received more payments

in euskos since 2017 and consequently had to find new suppliers or service providers within the network to spend these earnings.

Many of the stakeholders represented in the crown graph that were red in 2017, turned grey in 2018 or 2019. They represent the pathways of companies receiving very few digital euskos and failing to participate in the digital network or frequently using the digital tool. In 2019, the percentage of companies that did not use digital Euskos for payments fell to 40% and the average out degree increased to 2.3, showing a relative integration of new companies using the digital tool. The number of disconnected actors remained high. However, one must bear in mind that some companies may also use Eusko banknotes for B2B payments. The volume of transactions is being shared more evenly between actors, suggesting a greater circulation of money and an increase in the number of companies actively using the CLC. By the end of 2019, 54.7% of the 488 businesses involved in the entire network had made at least one B2B payment over the 2014-2019 period.

The diameter of the network, i.e. the longest shortest path between two nodes, increases continuously over 2014-2019 period. This increase reflects the formation of relatively long exchange circuits, connecting remote actors in terms of activity via money circulation. Some actors centralise a high volume of demand and trigger a succession of expenditures along the line, resulting in long chains of more than 10 actors with similar structures from the fifth or sixth actor onwards, after the point where the central actor receiving payments from many other firms enters the circuit. The length of the paths seems to develop over time. Aside from the longest path, the average path length is affected by the total size of the network, showing a remarkable increase between 2014 and 2015 and again between 2016 and 2017. This implies that as the number of actors increases, the size of the longest path expands along with the size of many paths in the network. This reflects the development of supply chains linking actors responding successively to each other's needs. These initial observations lead back to the question of production location: does the network developed within the CLC contribute to the development of production activities in the territory or only to the supply of goods and services?

Table 5 – Networks descriptive indicators

Year	Density	Average out degree	Diameter	Average path length
2014	0.06	1.6	5	1.9

2015	0.04	1.9	7	3.1
2016	0.03	2	9	3.6
2017	0.005	1.14	11	4.6
2018	0.005	1.7	10	4.1
2019	0.006	2.3	12	4.3

4.2 Localisation of production

Key survey questions and the study of the transaction data enable us to address the issue of the localisation of production and not only procurement, left aside by Marshall and O'Neil (2018). Local procurement benefits local actors and small local business and shops. It makes it possible to localise the share of the added value associated to the sale service. But if the goods sold are produced internationally, the added value of their production does not remain in the local area. As such, it is interesting to analyse to what extent the localisation of the procurement process also supports the localisation of production activities.

First, the volume of new demand directed towards CLC businesses remain low, according to the users. Indeed, 59% of business respondents to the SOL survey stated that they had not observed any effect on their turnover since their adoption of the CLC. Transactions data provides additional information to support this point. Businesses with digital accounts received an average of 7.1 payments from other businesses and 49.4 payments from individual users in 2019 (Table 3). They received an average of 1,180 euskos from their individual customers in 2019 and 2,059 euskos from their business customers. Although these amounts remain low compared to total turnover, they are not negligible, given that 60% of Eusko company respondents to the SOL survey declared an annual turnover of under €100,000.

21% of individual respondents (32% of Eusko respondents) also reported consuming a higher volume of local products since using the CLC. 16% of users (22% of Eusko users) also declared buying much more than before directly from producers and 22% a little more than before. These changes in behaviour have a direct impact on both local producers and local retailers and foster the localisation of production.

By analysing the transaction data, we address the question of the localisation of production through the development of production activities, and not only retail activities. In Table 6, we observe which business sectors receive the highest volumes of CLC payments and identify the newest customers, who also play a part in the localisation process by keeping the currency in circulation.

Table 6: Activity in Eusko by economic sectors over the period 2014 to 2019³

Sectors	Suppliers	Customers	Average received transactions	Average received volume	Share of total exchanged volume	Back conversion rate	Number of businesses in the sector
Farming	4.8	5.2	33.1	5,680.1	6.1	30.7%	35
Production of foodstuffs and beverages	2.1	13.6	70.1	7,874.8	8.9	47.2%	37
Other industrial products	2.3	7.5	16.8	13,414.3	6.6	20.6%	16
Retail	3.5	30.3	189.6	12,200.0	42.5	40.5%	114
Housing and food services	1.7	17.1	68.9	2,165.7	4.6	7.7	69
Information and communication	4.8	9.2	25.7	6,551.4	2.6	8.4	13
Scientific and technical activities	4.3	3.6	9.6	3,031.4	1.7	12.2%	18
Public administration, education, healthcare and social work	4.0	7.7	46.6	5,682.8	7.6	0.3%	44
Other service activities	7.9	39.2	237.0	7,782.9	14.0	11.2%	59
Unknown	1.9	5.2	20.5	2,195.8	5.0	15.1%	75

While retailers are by far the businesses that receive the largest share of exchanged CLC (42.5% of volume for 23.3% of business) and with the most CLC user clients, producers of food and industrial products and service providers are not exempt. For example, producers of "Other industrial products" receive on average the highest volume of CLCs over the period, and received 6.6% of the total exchanged volume. Food producers and housing and food services have on average 13.6 and 17.1 CLC users as customers, and received around 9% and 5% of the total exchanged amount, respectively. Service providers in education, social work and healthcare also account for 7.6% of the total Eusko turnover during the period. The "Other service activities" sector is artificially enlarged as it includes Euskal Moneta, the association that manages the currency. Even if trade activities account for most of the exchanges, producers of food and

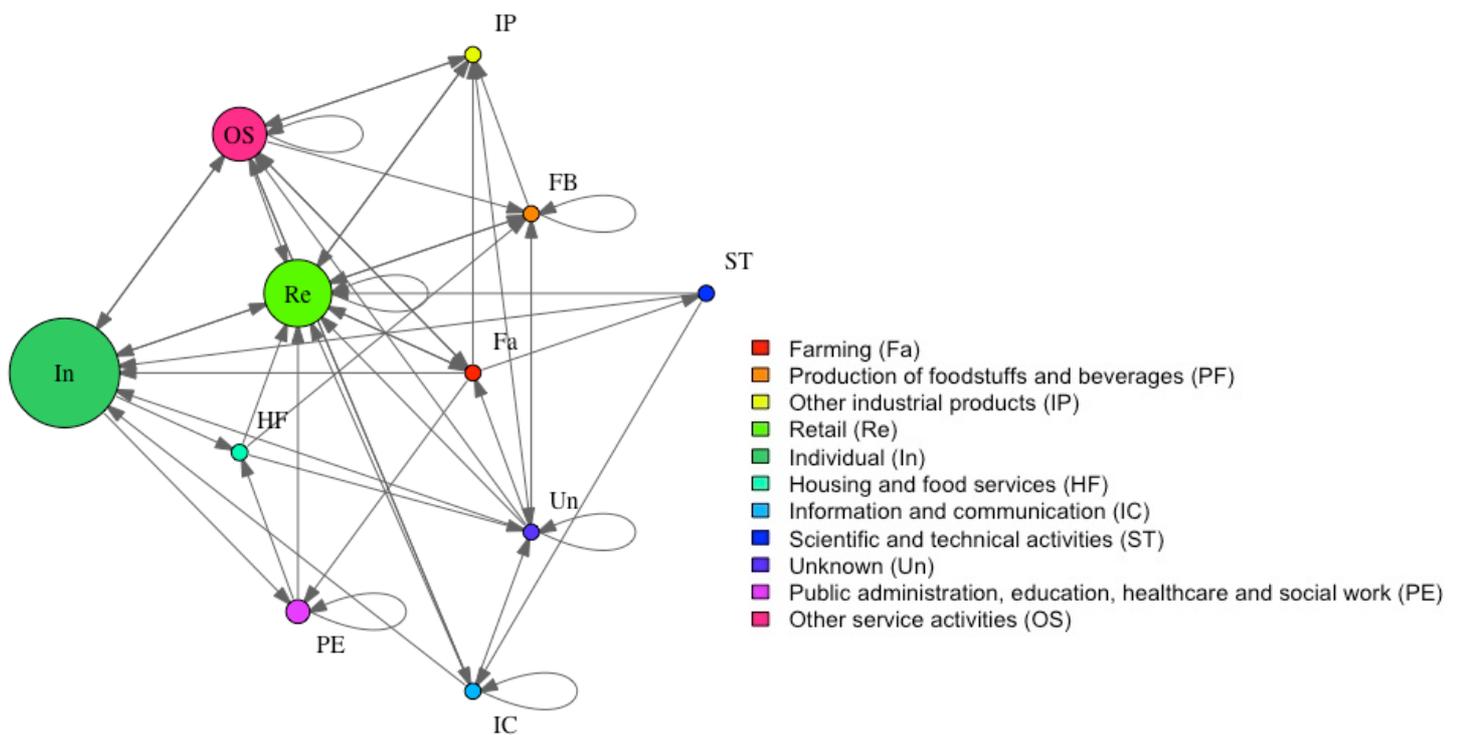
³ In Table 6, the sector with fewer than 3 firms have been deleted to avoid any possibility of identification. 6 sectors covering a total of 9 companies have thus been removed from the table. Together they accounted for less than 0.4% of the total transaction volume in euskos.

industrial goods and, moreover, service providers also received some income from their taking part in the convertible CLC community.

However, column 7, which shows the conversion rates by sector, i.e. the share of euskos received and converted into euros by companies, presents a more pessimistic situation. In fact, retailers –the companies that receive the most euskos– convert 40% of received euskos to euros. This figure jumps to 47% for food and drink producers, which are the third biggest sector to receive euskos after the omission of the Other Services sector. These results show that the CLC is still having difficulty circulating within the network and generating sufficiently large production chains for companies directly linked to consumers to spend the units received from their customers.

Figure 2 illustrates the links between the various Eusko sectors and individual consumers. The graph is read from left to right, taking the consumers (In) as the entry point. The size of the nodes is proportional to the volume of euskos used by sector players for payment. Individuals mainly use their euskos with businesses in four sectors: retail, other service activities, housing and food services, and public, education, health and social services. This supports the idea that consumers mainly use their euskos with retailers. The companies in these four sectors use their euskos with each other, but also incorporate new sectors, such as farmers, other industrial products, producers of consumable goods and information and communication services. As such, the structuring of production chains is beginning within Eusko members. Companies close to consumers, and particularly retailers, use their euskos from suppliers or service providers who carry out production activities in the territory. However, the size of the dots on the left of the graph illustrates the low volume of these transactions, which partly reflects the high conversion of euskos into euros by the retail sector. Thus, the retail sector receives 50% of the volume of consumer transactions. However, it only circulates 2/3 of this volume, with 40% of the euskos being converted into euros by this sector's actors (Table 6). As a result, sectors further down the production and distribution chain receive much smaller amounts of euskos than the initial amount exchanged.

Figure 2: Transactions between the most important sectors of the Eusko



5. Discussion

The findings of the quantitative survey and the analysis of transaction data are consistent. It can therefore be concluded that between a quarter and a third of CLC member companies find new suppliers or service providers within their CLC community. This is far more encouraging than the finding of no new business connections made by Marshall and O'Neil (2018). The number of new suppliers or service providers found by each firm is similar in both data sources and is around 3.5 new business relationships.

Even if the quantitative and more systematic approach of this study adds to Marshall and O'Neil's findings, the main methodological issues of the research remain: it is uncertain whether the observed B2B relationships can be classified as new, as well as the certainty that a new relationship would not have formed in the absence of the CLC. Indeed, the analysis of transaction data does not tell us whether the connections are new or whether they are existing client-provider relationships, in which exchanges previously took place in national currency and now take place in CLC. However, the SOL survey question asked precisely about new suppliers or service providers found through use of the CLC. The fact that 30% of businesses have stated that they use the directory or that 15% have already chosen between several suppliers because they accept CLC also consolidates the CLC's role in forming these relationships.

The use of CLC is not necessarily what drives a change in practices, since by choosing to use CLC, the actors, both individual and providers, demonstrate an existing interest in the ethical dimension of their economic behaviour. However, answers to the questions about the use of CLC tools show that CLCs contribute to and facilitate this process of change for a substantial proportion of them. This contribution to change, in practice, is in line with the analysis of Blanc (2015), for whom CLCs support the transition from the individual commitment of conscious actors to a collective action, by creating the conditions and infrastructure within which the change of practices is facilitated.

The direct link between the creation of a new supply chain within the monetary community and economic localisation is also not entirely direct.

Indeed, it might be that the new connections may replace previous ones with businesses in the territory, but which have not joined the currency. In this case, the new supply relations established within the CLC do not exactly consist in the localisation of procurement and production, but in a simple substitution of partner firms within the same territory. However, this observation directly questions the objectives of CLCs and the purpose of localisation itself. In-deed, CLCs do not only seek to territorialize the chains of production, but also to constitute a community of values (Blanc, 2016) and to foster a more sustainable local economy. Thus, by facilitating the creation of new relations between its members, the currency favours companies that have adhered to its charter and therefore share the organisation's values in terms of production ethics and environmental or territorial commitments. Even if the exchanges are not necessarily more local, they are concentrated within a selected community, and take part in its development.

Moreover, we extend the analysis to the localisation of production. 41% of turnover in euskos is generated by retail businesses. As such, the B2B relationship localisation is principally made in procurement and not in production activities. However, services and food production also gather a considerable share of total turnover, which is consistent with the development of a local domestic economy aimed at addressing the basic needs of the population that live in the area. Nevertheless, the amounts obtained by businesses in CLC remain low. Even if there is an increase in demand directed towards CLC member companies, it is unclear whether this is enough to induce a real increase in the production of these companies.

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Appendix 1: Socio-demographic variables of the SOL survey

Location	
Large city (more than 100,000 inhabitants)	36,7%
Medium-sized city (20,000 to 100,000 inhabitants)	20,9%
Small city (2,000 to 20,000 inhabitants)	21,9%
Villages	17,6%
Isolated	2,9%

Age	
below 18	0.0%
18-29	12.7%
30-39	23.3%
40-49	19.2%
50-59	19.5%
60-69	19.1%
70-79	5.3%
80 or older	0.0%

Gender	
Men	40,3%
Women	59,7%

Socio-professional category	
Farmers	0.5%
Craftspersons	1.6%
Retailers, company owner	3.1%
Professionals and assimilated	8.3%
Managers in the public service, intellectual and artistic professions	13.6%
Company managers	15.4%
Intermediate administrative and commercial occupations in companies	2.4%
Intermediate occupations in education, health, public service	12.1%
Technicians and supervisors	4.3%
Employees in the public service	4.9%
Administrative and commercial employees in companies	7.6%
Workers	1.6%
Retired farmers	0.2%
Retired craftspersons, retailers, company managers	1.1%
Retired managers and intermediate professions	14.8%
Retired workers	1.8%
Students	2.9%
Unemployed individuals (including individuals who have never worked)	3.6%

Appendix 2: Involvement in the organization

What is your status within the CLC organization?	
Employee/Intern	3%
Regular volunteer	13%
One-off volunteer	11%
Not active	74%
Number of respondent	1432

Have you ever participated in a vote or decision within the organization?	Individual	Businesses
Yes, often	16%	11.2%
Yes, sometimes	12%	12%
Yes, but rarely	12%	11.2%
No, never	61%	65.5%
Number of respondents	1,406	409