Sustainable Currency?  
A business analysis of the Bristol Pound

A report by Geofutures for

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Commercial and in confidence  
July 2020  
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Project background

The Bristol Pound is a network of over 2000 individuals and independent businesses who use digital and paper currency to trade in Bristol. It was established in 2010 as a non-profit community interest company (CIC), in partnership with the Bristol Credit Union. It aims to localise supply chains and keep money circulating in the city of Bristol.

This project aims to investigate how the Bristol Pound has facilitated a local economy, including business propensity, locations and patterns of currency circulation.

Project research objectives

- To provide a series of high-level business statistics, where available open and official government statistics allow, to indicate the importance of the Bristol Pound to the City of Bristol’s economy between 2012 and 2019.

- To analyse the dataset of official Bristol Pound businesses to show financial interactions between them in order to establish if there is any evidence of sustained currency circulation.
Data

Business data of the Bristol Pound is held by the Bristol Credit Union and was made available to investigate the project’s research objectives. An overview of business records provided in July 2019 is shown below in Table 1. There were over 619 business locations recorded in this dataset. There were around 11% missing or incorrect postcodes in the database and so any spatial patterns examined in the first half of the report omit these records. The full business database was used in the analysis of business transactions in the second half of the report.

Crucially, this analysis represents the overall analysis across the history of the Bristol Pound up to July 2019. Some of those 619 businesses, some may not have been currently registered and of the 575 that were judged to be active at the end of the period, many were not actively trading in £Bs (this abbreviation is used to distinguish the currency unit from the Bristol Pound organisation).

Table 1: An overview of the Bristol Pound business database suitable for spatial analysis

<table>
<thead>
<tr>
<th>All business records, July 2019</th>
<th>Geocoded to full unit postcode</th>
<th>% geocoded</th>
<th>Missing postcodes</th>
<th>% missing postcodes</th>
<th>Geocoded within City of Bristol Local Authority</th>
<th>% geocoded within City of Bristol Local Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>619</td>
<td>550</td>
<td>88.9</td>
<td>63</td>
<td>10.2</td>
<td>459</td>
<td>74.2</td>
</tr>
</tbody>
</table>

Business locations and characteristics

Where in Bristol?

Figure 1 below shows the geographic distribution of Bristol Pound businesses in Bristol. Around 17% of businesses fall outside the City of Bristol Local Authority boundary (Figure 2).

Around 45% fall within town centres across the country, and around 43% within the boundaries of Bristol, Clifton, Southville, Bedminster, Ashley Down, Staple Hill, Downend and Westbury-on-Trym. 36% fall within the main centre of Bristol, (Figure 3). The extent of town centres has been modelled by Geofutures¹, and provide consistently ‘like-for-like’ comparisons of areas of ‘town centre activity’ across the country. This includes a mix of activities and facilities for offices, retail and leisure with significant diversity and intensity. Over half of Bristol Pound businesses are found in peripheral town centre areas, but within these areas there is an element of co-location and clustering. It is hard for us to determine whether these are statistically significant clusters, or those caused by chance within the distribution of businesses because of the relatively low counts of businesses across the study area, particularly in residential or off-centre areas where businesses may be sparsely distributed.

Figure 1: The location of Bristol Pound businesses in the city

Figure 2: The location of Bristol Pound businesses in the region and nationally
Figure 3: The location of Bristol Pound relative to town centres

Bristol Pound businesses in Bristol count by postcode, July 2019
- 1
- 2
- 3
- 4
- 5 - 8

Statistical town centre boundaries
The City of Bristol Local Authority

To compare business patterns for the whole of the City of Bristol we have used an extract compiled from the Government Inter Departmental Business Register (IDBR). It represents the businesses registered with HM Revenue and Customs (HMRC) for Value Added Tax (VAT) and/or Pay As You Earn (PAYE).

IDBR counts use ‘local units’. A local unit is an individual site (for example a factory or shop) associated with an enterprise. It can also be referred to as a workplace. The latest available data is for 2018, recording the number of local units that were live at a reference date in March.

These patterns are based on the best available official statistics at the small area; three quarters of UK private sector businesses however are non-employers, and the majority of these are not registered for either VAT or PAYE. At the start of 2018 around 45% (an estimated 2.6million) private sector businesses in the UK were registered for VAT or PAYE. Of these, 13% of sole proprietorships and 52% of partnerships were registered for VAT or PAYE². Therefore, the following business counts from the IDBR are representative of around half the businesses in the area, specifically reflecting businesses registered for VAT or PAYE.

Current Bristol pound businesses represent an estimated 2% of the business population in the City of Bristol Local Authority when measuring against VAT and PAYE registered businesses. This may be closer to 1% given the under-estimation of the IDBR as detailed above. For illustration, Figure 4 shows how this compares geographically, with a tendency for Bristol Pound businesses to be found in locations close to, but not necessarily in, the city centre, although again the relative proportions may be different than as the geographic distribution of non-VAT or PAYE businesses (omitted in Figure 4) is not known.

Figure 4: The propensity of Bristol Pound businesses by MSOA

% Bristol Pound businesses July 2019 of all VAT/PAYE registered businesses, March 2018 by Middle Layer Super Output Area, 2011

0.0 - 0.5
0.6 - 1.0
1.1 - 1.5
1.6 - 2.0
2.1 - 7.1

The City of Bristol Local Authority,

Legal Status
The legal status of Bristol Pound businesses is likely to be a similar reflection of the wider economy. Only a small proportion of Bristol Pound businesses in the dataset are noted as public sector businesses. Whilst we considered these numbers to be useful for inclusion, conclusions are limited due to over half of the Credit Union data having no legal status recorded, and as before, the IDBR comparisons only reflecting VAT and PAYE registered businesses.

Table 2

<table>
<thead>
<tr>
<th>Legal Status</th>
<th>Total number of local units registered for VAT/PAYE in the City of Bristol Local Authority, March 2018</th>
<th>% of local units registered for VAT/PAYE in the City of Bristol Local Authority, March 2018</th>
<th>Total number of Bristol Pound businesses, July 2019</th>
<th>% of Bristol Pound businesses, July 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public sector</td>
<td>420</td>
<td>1.9</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Private sector</td>
<td>21,755</td>
<td>98.1</td>
<td>278</td>
<td>44.9</td>
</tr>
<tr>
<td>Unknown</td>
<td>0</td>
<td>0</td>
<td>340</td>
<td>54.9</td>
</tr>
<tr>
<td>Total</td>
<td>22,175</td>
<td>100</td>
<td>619</td>
<td>100</td>
</tr>
</tbody>
</table>

Data sources: Inter Departmental Business Register (IDBR) 2018, Bristol Pound, Bristol Credit Union.

Industry sectors

Around 50% of records from the Credit Union business dataset have a Standard Industrial Classification (SIC) 2007 code recorded. Using this sample we have compared the VAT and PAYE registered businesses in the City of Bristol in 2018 to examine the trends of Bristol Pound business industry types compared to the area as a whole (Figure 5).

The data suggests Bristol Pound businesses to include more accommodation, food service, wholesale and retail trade, arts, entertainment and recreation and manufacturing businesses than average. In addition businesses are less represented in construction, transport, storage, information and communication, financial and real estate.

As before, caution must be added when interpreting the IDBR data, as the types of businesses not registered for VAT or PAYE may not follow the same distribution across sectors, and so the comparison will not be an exact reflection of the whole Bristol economy, but nevertheless this analysis indicates key sectors that could help the shape of the marketing strategy of the Bristol Pound’s successor, Bristol Pay.
Figure 5: Business sectors

Businesses by SIC 2007 sector

A: Agriculture, forestry and fishing
B: Mining and quarrying
C: Manufacturing
D: Electricity, gas, steam and air conditioning supply
E: Water supply; sewerage, waste management and remediation activities
F: Construction
G: Wholesale and retail trade; repair of motor vehicles and motorcycles
H: Transportation and storage
I: Accommodation and food service activities
J: Information and communication
K: Financial and insurance activities
L: Real estate activities
M: Professional, scientific and technical activities
N: Administrative and support service activities
O: Public administration and defence; compulsory social security
P: Education
Q: Human health and social work activities
R: Arts, entertainment and recreation
S: Other service activities

% local units registered for VAT/PAYE in the City of Bristol Local Authority, March 2018 (IDBR)
% Bristol Pound businesses, July 2019 (based on a 50% sample of Credit Union data)
Mapping currency circulation

Why look at currency circulation?

For the Bristol Pound to be sustainable then the currency needs to continually circulate.

The Bristol Pound is an open system, meaning people and organisations can not only purchase £Bs but also can exchange £Bs for Sterling to get their money out of the scheme; an important measure of the success of the Bristol Pound will be determined by the degree to which it supports a fairly closed business ecosystem. What we mean by this, is that businesses and organisations exchange the currency with each other over a long period of time, effectively recycling and reusing £Bs within the local economy.

All £B transactions are recorded electronically and are stored in a database held and maintained by the Bristol Credit Union. While this database includes transactions between individual consumers and businesses the scope of this project is to focus on business to business (B2B) transactions in order to establish if the Bristol Pound played an important part in the city’s business ecosystem.

The database which underpins the Bristol Pound contains not only information on the businesses and organisations that have subscribed to the scheme, but also detailed info on every £B transaction including the date of the transaction, the two parties involved, and the £B exchanged between them.

An important caveat is that we understand from the Bristol Credit Union that the database we analysed is not fully comprehensive and does not include some businesses signed up to the Bristol Pound (such as electricity providers for example) since information on these is retained on a separate system. Nevertheless, we understand that we can nevertheless analyse the transactions of the vast majority of businesses in the scheme.

Using a graph model, we are able to visualise the transaction between two businesses. The businesses can be represented as circles or nodes, the direction of the transaction shown by the arrowed line or link, and the total £B exchanged. In Figure 6 below, we see both a single transaction between two businesses on the left. Since we can also aggregate all transactions between these two businesses, we can see that they have traded many times between 2012 and 2019.

![Graph Model of £B Transactions](image)

**Figure 6: Mapping £B transactions singularly and in aggregate**
The Transaction Web

As well as looking at the relationships between single business, we can map all transactions between businesses and organisations and get a sense of the complexity of the £B economy. Figure 7 below shows all the £B transactions between 2012 and 2019 with the nodes on the graphs being organisations and the links signifying aggregate transactions (i.e. each link records the total number of transactions over the whole period).

We call this representation a Transaction Web.

Figure 7: The transaction web of all B2B transactions with the £B between 2012 and 2019
There are some interesting features emerging representation:

- It’s possible to see at the heart of the transaction web, a small number of businesses that have attracted a lot of transactions between 2012 and 2019. These are key nodes in the Bristol Pound ecosystem and these are needed to maintain its resilience.
- Also, on the periphery, we see businesses that either inject money into the web (often only in one or two transactions) or businesses into which £B are paid, but which undertake no other transactions the other way.
- Although not readily visible, there are also a couple of larger businesses which accepted £B but failed to onwardly transact, effectively acting as blackhole into which the currency was sucked.

**Circulation Loops**

Within a transaction web, there are a number of pathways through which currency can move. If it is possible for a £B to effectively return to the start of a pathway, then we can describe this circuit as a circulation loop.

At its most basic we could envisage a circulation loop as occurring between two separate businesses that decide to mediate their financial interactions using the Bristol pound. Effectively we can see a financial closed loop - as shown above in Figure 6 (c).

While this does represent a closed system it is not particularly resilient because should one of the businesses decided to no longer use the Bristol pound then this financial interaction would cease. Ideally, we would be looking for a more complex web of interactions, with the £B being transferred and traded across multiple circulation loops and not terminating with a business that does not on-trade.

**Figure 7: Complex currency circulation loop**

In the Figure 7 we can a subset of the transaction web that shows 6 businesses that are mutually trading £B. Even though a single £B can take many different routes through this small sub-system, we can see that there is a single business in the centre which if removed, would stop all the circulation since the two businesses at the bottom of the figure are not connected.

Circulation loops in the Bristol Pound tend to be more complex than this simple representation but the importance of businesses and organisations that sit as key nodes in these loops cannot be underestimated, and the loss of them ultimately compromises the integrity of the transaction web.
The evolving Transaction Web between 2012 and 2019

While Figure 7 shows all transactions for the period 2012 – 2019 so to really understand the transaction web, it is important to first look at the evolution of the Bristol Pound year on year.

The earliest £B transactions occurred in 2012 and we can a number of key features emerging (Figure 9). The first is the first transaction cluster appearing with a sole business at its heart; the transactions are all one-way at this point and there is a single B2B relationship where 26 transactions have occurred between (Food Wholesaler 1 at the centre and Food Store 1 with 26. Both are still active).

<table>
<thead>
<tr>
<th>Year</th>
<th>B2B Transactions</th>
<th>£B Transacted B2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>38</td>
<td>£10,000</td>
</tr>
<tr>
<td>2013</td>
<td>319</td>
<td>£100,000</td>
</tr>
</tbody>
</table>

Figure 9: The £B circulation system in 2012 and 2013

We can also see the first evidence of circulation with a transaction chain occurring involving three businesses with a business both accepting £B and also paying another supplier with £B (Bakery 1). We can also see an orphaned transaction – a single B2B transaction. It is important to note at this point that our analysis is purely B2B and does not reflect transactions that businesses have with consumers. Since many of the businesses shown are in the food sector, we would expect a large number of C2B transactions to be feeding this evolving transaction web.

By the end of 2013, the network has grown in complexity. We can see a cluster comprising three key nodes growing around the original Food Wholesaler 1 Cluster, including a restaurant business based in central Bristol (which was the recipient of the orphaned transaction in 2012) and a publishing business.
The second cluster emerging on the bottom left of the diagram are focused on a public sector organisation and the Bristol Pound CIC. Bakery 1 is still not connected to the main system but the number of transactions and number of customers is increasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total B2B transactions</th>
<th>Total £B transacted B2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>483</td>
<td>£167,000</td>
</tr>
<tr>
<td>2015</td>
<td>698</td>
<td>£185,000</td>
</tr>
</tbody>
</table>

**Figure 10: The £B circulation system in 2014 and 2015**

By 2014, the total number of businesses in the system has further increased and two strong transactions nodes are starting to dominate the network – Food Wholesaler 1 and the Bristol Pound CIC - but as well as a concentration of activity around these nodes, we can also see the increasingly web-like structure of the currency transactions and growing evidence of currency circulations (Figure 10). The web-like nature of the currency is clearly evident by 2015 and is especially noticeable in the bottom portion of the graph. Although this emerging network is predominantly associated with the food and drink sector with key businesses forming the web including two further food wholesalers. Furthermore, linking quite clearly to the Food Wholesaler 1 cluster, it is noticeable that support businesses are also being drawn in including waste disposal, plumbers, office suppliers, cleaning contractors and so on. This starts to suggest that once a backbone is established, that the transaction web and business ecosystem begins to grow in size and complexity. 2015 represented the high water mark of the Bristol Pound in terms of the number of traders.
In 2016 we see both the decline in the relative importance of some nodes in the transaction web (such and the disappearance of key nodes as some larger organisations either cease trading, or stop transacting £Bs. This leads to further consolidation around the food and drink sector, again with Food Wholesaler 1 as the key node, but others forming importance sub nodes, such as Food Wholesaler 2 and a waste disposal business. The decline in active traders from the peak in 2015 that was first evident in 2016 continues into 2017 by which time around a quarter of active traders have been lost to the Bristol Pound (Figure 11).
2018
Total B2B transactions: 810
Total £B transacted B2B: £189,000

2019 (up to August 2019)
Total B2B transactions: 271
Total £B transacted B2B: £63,000

Figure 12: The £B circulation system in 2018 and 2019

While 2018 saw a record total of £B transacted in the B2B web, we can see that this web is losing linkages and is looking less resilient and by August in 2019 (the time up to which we have transaction data) the web is significantly more sparse and more akin to the complexity last seen in 2013 (Figure 12). A key difference though is while the backbone of the food and drink sector remains (and as was central to the web in 2013) the transaction web now contains more support businesses.
Concluding remarks

Key recommendation
Our key recommendation that clearly emerges from this analysis is that the Bristol Pound and/or Bristol Pay need to constantly monitor the transaction web and give active support to key business nodes within it. If these key nodes withdraw from the scheme, its long-term resilience will inevitably be compromised.

The importance of the food sector
The transaction history shown above from 2012 to 2019 shows the importance of the food sector in the Bristol Pound’s economic ecosystem – its dominance clearly shown in Figure 5 earlier.

Food wholesalers and retailers were some of the first to sign up to the Bristol Pound and it is striking that despite the decline of the currency from 2016 onwards the circulation loops that have persisted are those centred on the food businesses suggesting that the £B has a long term viability in this economic sector.

There may be many reasons for this: individual consumers may be more inclined to purchase food and drink in local businesses using the £B and a significant proportion of the food sector is predominantly localised in nature, without the need to interact with regional and national businesses who do not subscribe to the Bristol pound.

Future endeavours by the Bristol Pound and Bristol Pay might consider focussing on the food sector, which is both B2B and C2B as a suitable candidate for the reinvigoration of a local currency system.
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The prices and timescales included in this document are subject to final confirmation of a project brief, may be subject to sight of data supplied, and remain current for 4 weeks from delivery of this proposal.

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