The local economic multiplier effect of edibLE16:

A supply chain survey

November 2017

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ADAPT Management
Knowledge, Learning, Change

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Table of Contents

Index of Tables

Acknowledgements:

1. Executive Summary:

The LM3 is a tool that adapts the macroeconomic theory of multipliers for use in microeconomic circumstances. On the basis of this theory, the LM3 is an indicator that tracks how effective an initial investment is with respect to the length of time it remains within a defined economic area, and the amount of additional work that it leverages.

The LM3 is a method that tracks the local multiplier effect to the third round of spending. In practice, this translates to how the initial investment with the organisation of interest (first round or R1) is, in turn, spent with that organisation's suppliers (second round or R2), and the percentage of that income those suppliers spend within the locally defined area (third round or R3).

In the present evaluation, the initial investment, whether through grant funding or through customer sales, with edibLE16 has been assessed using the financial business records. After a process of data cleaning and arranging, the second round (R2) was calculated. These are all of the suppliers that edibLE16 spent money with in order to fulfil customer orders and to maintain itself as a business. R2 is the first point at which the distinction between local and non-local applies. What is outside of the bounded area of economic interest is excluded from subsequent calculations.

The third round (R3) poses some methodological challenges because it seeks to track the amount of spend by suppliers to edibLE16 that also fall within the local and bounded economic area. To acquire this date, suppliers were surveyed for their estimated percentage of income spent within a twenty mile radius of Market Harborough. Only some of these suppliers surveyed responded with data, which means that there were significant gaps in the data set. Dealing with missing values is almost always problematic in such evaluations, so two approaches were adopted.

The first of these methods constrained the analysis to only those suppliers which reported their own percentage of spend that was local to the bounded area. The second approach clustered suppliers into sectors, and then derived median values based on the suppliers

which did respond to the surveys, and attributed these to those missing values that corresponded to the same sector. In this way, the missing values from suppliers of fruit and vegetables, for example, could be addressed by using the median percentage of local spend reported by other businesses within that same sector. This culminated in a set of combined values, those that were reported, and the attributed median percentages on a sector by sector basis.

Of note here is a methodological decision that was taken to preserve the anonymity of the small number of employees of edibLE16. No members of staff were surveyed for their estimated percentage of income spent locally, although one might assume this to be reasonably high. In future evaluations, this decision may be reconsidered. However, the consequence is that some £22,000 of R2 spend has been deliberately excluded from the calculations of the R3 spend. Furthermore, no representative supplier from the baked goods sector responded to the survey, so any R3 contributions from this sector are also excluded.

The findings from this evaluation are nevertheless informative. The LM3 ratio tends to show a strong emphasis across the supply chain in keeping the investment local. With ratio values ranging from 1.95 to 2.24 depending on whether method one or two was used to deal with missing values suggests that an initial investment with edibLE16 has proven to be effective, that the initial investment tends to remain within the local economic area, and that the investment is made to do additional work at each round of spending.

This report concludes with ways of interpreting the findings and with some recommendations for how the method itself could be improved. It should be reiterated that the LM3 is simply an indicator. As more data points are added for comparison, a richer pattern of economic flows can be developed. However, regardless of whether or not this type of evaluation is utilised again in the future, for the three years from October 2014 to August 2017, investing with edibLE16 can be evidenced to have contributed to the local economic area of Market Harborough by between £0.95 to £1.24 (depending on the method used to manage missing vales).

2. Introduction:

This report considers the economic outcome and effectiveness of edibLE16 within the context of a bounded twenty mile radius of Market Harborough over four years of business transactions, from October 2014 to October 2017, inclusive. It presents data demonstrating the indicative economic impact on the wider Market Harborough food and drink sector by shopping with edibLE16.

To some extent, the food and drink sector seems to embody the aspirations of the shop local philosophy. Not only is there already something aesthetically attractive about the prospect of eating fresh food that has travelled a short supply chain from farm to fork (Edwards-Jones *et al.*, 2008), and some evidence to support potential health benefits of doing so (Kellou and Supagro, 2014), but there is also an intuitive sense that supporting local and independent retailers is good for the local economic area as well. While the benefits of the local food agenda continue to be debated (Tovey, 2009), the potential economic impact of supporting local and independent retailers and suppliers is less contested (SERIO, 2012).

The added value to wider economic, social and environmental benefits arising from initial investments is a well-recognised principle in the UK policy context. It underpins 'shop local' campaigns in favour of supporting local and independent retailers, and also informs the localisation agenda itself (H.M. Government, 2011). The recognition of local multiplier effects contributes to the government's emphasis on accounting for social costs and benefits of projects using public resources which is at the heart of the Treasury's "Green Book" (HM Treasury, 2003). More recently, this has been enshrined in the Public Services (Social Value) Act (Cabinet Office, 2012), wherein public authorities are expected to have "regard to economic, social and environmental well-being in connection with public services contracts". This latter emphasis signals a shift towards evaluations being expected to provide measures of outcomes, rather than simply costs and benefits. The

difference between the two evaluations reflects a focus on the efficiency of an intervention or a project, relating to products and outputs, versus a project's effectiveness, which relates to longer-term outcomes. The current evaluation of edibLE16's wider economic impacts on the local food and drink sector in Market Harborough epitomises this shift in emphasis towards project effectiveness.

The local multiplier to the third round (LM3) is a method to track the movement of spending within a defined economic area. It returns an indicator that represents the ratio of an initial financial investment to the total work that investment contributes across, in this case, three rounds of spending. The method may be thought of as a measure of what contribution an initial spend in a local area has on the resilience and well-being of that local economy. In other words, the economic multiplier effect is an indicator of the amount of work done by an initial investment across each round of spend *as if* at each round this was new money entering the system. With each successive round however, because the effect is a percentage of the initial spend, this will decrease in quantity each time.

The theory for this work is based on the economic multiplier effect which is a measure of how greater effectiveness is extracted from an initial amount of financial investment. The longer an initial financial investment, or spend, circulates through the economy of a geographically bound area, the more work that initial investment is thought to have achieved. This is the multiplier effect, so-called because the initial investment is said to multiply its effects over time as it is subsequently reinvested in the local economic area. The magnitude of the multiplier effect is thought to correlate positively with increases in the local well-being and social value outcomes associated with the initial spend. The method is derived from the macroeconomic theories of Keynes and Leontief,[1] which consider the multiplier effect at national or regional scales reflected in input-output (I-O) tables across each economic sector.

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1   See https://en.wikipedia.org/wiki/John_Maynard_Keynes and
     https://en.wikipedia.org/wiki/Wassily_Leontief

However, methods for evaluating economic impacts can involve complex calculations and the use of macroeconomic input-out tables. To provide a tool that balances both rigour of analysis with ease of use by non-profit and small business organisations, the Countryside Agency collaborated with the New Economic Foundation to adapt the macroeconomic multiplier to enhance its use at local and organisational – that is, *micro*economic – scales, and to track the movements of local monetary flows to the third round of spending. The difference between the national input-output tables and the LM3 is both one of scale (the LM3 draws its focus on microeconomic transactions between spend and supplier), and that the LM3 is a simplified way of deriving the indicator, unlike the input-out tables which involve a significant contribution from economists and analysts.

By evaluating the LM3 ratio for a small and medium-sized enterprise (SME), such as edibLE16, a ratio can be returned indicating a quantification of the additional work customer spend with edibLE16 generates through the local supply chain. This indicator may be used for performance monitoring and improvement planning, to demonstrate the additional value of the business to the local area and upstream suppliers to funders, and in advertising. And, where sufficient data are collected, the indicators could also potentially reflect comparisons among business models and across sectors within a given economic region.

Because it is clearly impossible to track precise purchases, or to trace the actual money used,[2] certain simplifying assumptions are made. First, it is constrained to a defined geographical boundary. The nature of this boundary is relatively arbitrary and could be drawn according to any set of criteria. Second, as the rounds of spending to be evaluated increases, the rigour of the data returned decreases. Because it is an adapted tool, and because the degree of rigour and quality of data employed in calculating the LM3 is not equivalent to that calculated at a national scale, *the LM3 results are to be treated as indicative only*. That is, the LM3 ratio (of initial spend to third spending round) indicates a pattern of approximated or estimated influence; it is *not a precise metric*.

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2   In Justin Sack's *The money trail* (Sacks, 2002), the metaphor of a blue painted pound coin is used to model how that pound might move through a village retail and service sector, leaving a blue imprint on all merchants who touch it. The number of merchants with a blue finger print is the measure of the multiplier effect: the more blue fingers, the higher the multiplier effect of that initial £1 coin.

The LM3 model is essentially a survey method. To obtain the estimated percentage of local spend by suppliers to edibLE16, almost 30 of the more significant suppliers were contacted via email and by telephone. In some cases, a follow up email was sent, and up to two follow up telephone calls were made. Given the small number of staff employed by edibLE16, to limit risk of reducing respondent anonymity, the decision was made to exclude surveying individuals on their own R3 spending patterns.

Of the 54 unique local suppliers to edibLE16, 21 surveys were returned from a range of food and drink sectors. This survey response reflected a reasonable cross-section of the supply-base, with the exception of those who supplied baked goods, for which no information was returned. The suppliers who responded to the survey attract 50% of the R2 spend. When the total of wages paid is removed, the R2 spend is reduced to £54,614.65, which means that the spend with those suppliers who responded to the surveys rises to 70% of the (amended) R2 income stream to the area.

However, the method of the LM3 does not permit excluding contributions to the R2 spend on a selective basis. From the perspective of the model, the R2 is – and must necessarily be, for the model to work – *the sum total of all spend* by edibLE16 which meets the criterion of being spent with suppliers within the defined area. What happens to that income stream is then the focus of the R3 calculations.

In light of there being some missing values due to a lack of response from surveyed suppliers, in one instance representing the entire baked goods supply sector, a diverse range of once off payments, and the methodological decision to exclude surveying employed staff, there are a number of missing values which have to be addressed in the R3 calculations. Two approaches have been taken.

The first approach uses only those percentage estimates returned by surveyed suppliers. That is, the 21 responses were used to calculate the ratio of R1 income with third round local spend, because the percentage of R2 income to these suppliers was known with a reasonable degree of confidence.[3] Using this method, those suppliers which did not respond, or were not surveyed, were excluded in terms of their contributions to the R3 local spend because this was unknown. In the calculations that follow, this approach is referenced as R3(a), which leads to the derived ratio LM3(a).

The second approach to the missing values sought to find a way to include, in a logically defensible way, as many of the missing values as possible, without violating the method of the LM3 model. This approach, referred to as R3(b), clusters the suppliers into food and drink supply clusters on the basis of the principle focus of business. This generated nine clusters, referred to here as 'sectors', including the catch-all cluster of wages paid, once-off payments, admission and venues rental costs, and so on. Of these nine sectors, there was at least one representative business for each of the nine sectors, bar two. One of these was the diverse 'Other' cluster of services (designated as 'OT' in the spreadsheet calculations), and the other was 'Baked Goods' (or 'BG') cluster.

For the remaining seven sectors about which at least one business had responded to the survey, the median percentage estimate for that sector was determined, and then applied to other suppliers representing that sector which had not responded. For example, if three businesses from the fruit and vegetable sector ('FV') had responded with estimates, their estimates were combined and the median value used as the basis with which to evaluate the percentage of local spend by other FV suppliers about which no information was available.

In effect, this approach extrapolates from the known median values of a sector to fill in the missing values of other suppliers within that same sector. Of course, where the values

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3   This confidence rests on the untested assumption that the suppliers each interpreted the request for information by applying the estimate in the same way. The degree to which this was actually the case is not known. However, it does lead to some recommendations for any future iterations of the LM3 method.

were known, these were retained throughout. Only the missing values were supplemented by median values from the same sector. This second approach derives the LM3(b) ratio.

As a market town, Harborough offers the potential advantage of having a long history of drawing on its own hinterland to provide for itself. In fact, this goes to the root of Harborough's *raison-d'être* as a 12th Century creation. A twenty mile radius affords a business like edibLE16 'local' access to large urban, peri-urban, and agricultural areas from Leicester to Rugby and into Northamptonshire. One would expect a reasonable LM3 as a result given the range of enterprises which likely fall within this boundary. However, a significant amount of edibLE16's spend with suppliers falls within an area much smaller than the selected boundary.

To be clear, the LM3 is an indicator, not a precise metric. It is an indicator of the *pattern of economic efficiency* in a local economic area given an initial impetus (R1) of investment or spend. In some bounded areas, there may be a desert of economic activity: no local businesses, not even any corner stores. In other areas, there may be an oasis, with almost everything one could want within a set radius. The issue concerns the nature of the boundary defined, and the context of the socio-economic spaces within which that boundary is defined.

In the present report, care has been paid to making the working assumptions and methods employed as transparent as possible, so that should this work be replicated in the future, the findings between the two evaluations may be reasonably compared for change and the direction of travel.

While the findings in this report may have contributory value to the summative review currently underway of the Sustainable Harborough Project which helped resource, support and endorse edibLE16 during its formative years, the target audience for the report is edibLE16 and its upstream suppliers. It is hoped that the findings will be of use to edibLE16 in reaching strategic decisions about their own supply chain management to

optimise the effectiveness of customer spending in contributing to the economic resilience of the local food and drink sector.

3. Method:

Evaluating the impact of projects requires a number of critical decisions to be made, such as, over what period of time and geographic scale are changes to be measured? How accurate and reliable are the source data used in the measurement process? And the issues of attribution and counterfactuals – how much of any change might be attributed to the work of one project, and what might have happened even if the project had not been in operation anyway? While there are no hard and fast answers, and any answer given will vary from project to project, it is important that each of these questions are answered and accounted for transparently. While the present work contributes to addressing the question of attribution, it cannot address what would have happened had edibLE16 *not* existed.

The purpose of the present section is to record these assumptions and decisions, and to provide an outline of the way the challenge of evaluating the economic impacts of buying through edibLE16 were addressed. If such evaluative work were to be repeated, future evaluators might make the same assumptions or amend these to reflect changing circumstances and points of interest.

The process for evaluating the LM3 of a SME, like edibLE16, is as follows:

    define the geographic boundary for the survey
    define the initial spend of interest (round 1)
    decide the rounds of spending to track
    acquire the financial data for each round
    derive the ratio
    report and interpret the ratio

As noted in the Introduction, the geographic boundary was set at a twenty mile circular radius, with Market Harborough at its centre. The logic of this boundary is that edibLE16

have instituted a delivery service to customers within this same boundary. Consequently, to track spend within this radius is consistent with the LM3 method, which constrains both the distribution of customers as well as suppliers to within this boundary.

These data were derived from reviewing the financial accounts kept as spreadsheets and more recently SagePay print outs. The difference in the level of detail between the bespoke spreadsheets and the automated SagePay accounts is significant, and the former enabled a greater level of confidence in the accuracy of tracking the spend than did the latter.

Three rounds (R1, R2, and R3) of spend were defined. The initial or first round (R1) of spending was defined as *all income* to edibLE16. This includes both grant funding, from the Sustainable Harborough Project and elsewhere, as well as income generated through sales to customers. Because this is treated as income, no effort has been made to separate these streams, and these are therefore consolidated as one income stream at the level of R1.[4]

The next round of spending (R2) is how edibLE16 spent the R1 income. R2 spending tracks the range of suppliers with which edibLE16 interacted, both to satisfy customer orders from R1, but also associated with the costs of doing business. R2 is the first stage at which a distinction is drawn between those suppliers to edibLE16 which are either inside or outside of the twenty mile radius, that is, 'local' and 'non-local' respectively. Where this distinction could not be made, suppliers were listed as 'unknown'. The total spend with known local suppliers constitutes the R2. In turn, these suppliers were tracked for the R3 calculations.

The third round (R3) is the last of the spending rounds of interest. The R3 evaluation surveyed those actors which collectively attracted the largest percentage of the R2 spend (with the exception of surveying staff of edibLE16) which supplied edibLE16 with goods

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4   Separating R1 income streams by providence into grant and sales incomes for purposes of evaluation is not feasible. To do so will introduce systematic error into the evaluation resulting from a misalignment of income and spend. Hence, the model does not admit any method through which to determine the providence of the income used to pay an upstream supplier.

(e.g. food products) and services (e.g., ITC, advertising, etc.) for the *estimated percentage* of their *own total income* spent within the twenty mile boundary. This percentage estimate was then multiplied against the total of R2 spend with that supplier. This results in the R3 value, as a percentage of R2 investment that stays within the bounded area for a further round.

The decision to request a percentage estimate was made to preserve the privacy of business income information, and to facilitate the ease for R3 suppliers to participate in the survey. However, this strategy exerts a cost on the confidence that can be placed in the data quality of R3.

A second challenge in the LM3 model is how to deal with missing values due to surveys not being returned. Initial requests for information were sent out via email, followed by a second email, and then followed by one or more telephone calls. For those surveys that were returned, the risk to confidence concerns the interpretation of what constitutes a percentage of spend locally. This is likely to range across those surveyed, and in some instances, corrections had to be made to the data submitted where errors were obvious.

While the LM model is theoretically extendable to *n* rounds, it is customarily restrained to only three rounds because the value of trade-off between effort to collect and the quality of the data returned decreases beyond the third round.

Once the data for each of the three rounds had been collected, and cleaned where necessary, the formula for deriving the LM3 is:

$$\frac{\text{Round 1 spend + Round 2 spend + Round 3 spend}}{\text{Round 1 spend}}$$

This returns a ratio in the form of

£1 initial spend : multiplier

To derive the *added* contribution to the local economy of the initial spend, the £1 initial spend is subtracted from the ratio.

4. Findings and Discussion:

The calculation of the LM3 for edibLE16 involves three sequential calculations, as follows:

Calculate R1, by initial investment amount per financial year

Calculate R2, by the amount of R1 spend per financial year within the area

Calculate R3, by the percentage of R2 spent locally per financial year

These steps are discussed below:

4.1. Round 1 Calculations:

The records for edibLE16 begin in mid-October 2014, and are grouped by fiscal year:[5]

2014 – 2015: October 13 2014 to August 27th 2015
2015 – 2016: September 1st 2015 to August 31st 2016
2016 – 2017: September 1st 2016 to August 30th, 2017

Within these records, there are also two types of income, grant funding and customer sales. For completeness, these are summarised (in £s) as follows (Table 1):

Year	Grant Funding	Customer Income	Total R1:
2014 – 2015	6,390.87	15,248.73	21,639.60
2015 – 2016	15,198.72	28,165.51	43,364.23
2016 – 2017	4,754.90	29,253.53	34,008.43
Total:	**26,344.49**	**72,667.77**	**99,012.26**
Ave:	*8,781.50*	*24,222.59*	*33,004.09*

Table 1. R1 Spend summary

The income streams have *not* been distinguished in the following calculations because no providence can be attributed to either in upstream spending, and to remove one stream introduces systematic error.

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5   The financial year for edibLE16, according to Companies House records, is September 1st to August 31st.

4.2. Round 2 Calculations:

Differentiating the suppliers paid by edibLE16 from the R1 income into local and non-local, results in the following summary (Table 2.). Table 2 summarises the expenditure of each financial year across suppliers that can be differentiated into local, non-local, and those the location of which is unknown.

Year	Total (R2):[6]	R2 Local	% R2 Local Spend	Non-Local	Unknown
2014 – 2015	20,263.48	17,258.10	85.17	1,759.49	1,245.89
2015 – 2016	37,856.62	33,073.86	87.37	1,800.13	2,982.63
2016 – 2017	29,487.02	26,319.69	89.26	1,802.97	1,364.36
Total:	**87,607.12**	**76,651.65**	**–**	**5,362.59**	**5,592.88**
Ave:	*29,202.37*	*25,550.55*	*87.26*	*1,787.53*	*1,864.29*

Table 2. R2 Spend summary

Table 2 summarises the amount of spend by edibLE16 with supply chain actors. Of this, the proportion and percentage of total spend within the twenty mile radius of Market Harborough is shown. It is apparent from Table 2 that edibLE16 have, since the beginning of their business, made an effort to invest with local suppliers, with an overall average spend as 87% of total income with local suppliers. There is the potential that this could be higher, but a number of suppliers were not identified in the source data and could not be included in the evaluation.

Spending with non-local sources is commonly associated with services, such as banks, insurance premiums, SagePay and Microsoft Office systems, and also with nation-wide advertising opportunities. Generally, spend with national chain stores and services was excluded from the evaluation. For the next round (R3) of calculations, the data pertaining to the "R2 Local" column of Table 2 are of interest.

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6   Total (R2) refers to all spend by edibLE16. This is further broken down into local, non-local and unknown spend where the creditor can be identified. For the purposes of the LM3 method, only the local component of the R2 is used.

4.3. Round 3 Calculations:

As outlined in the Introduction, two methods of evaluation are applied to the R3 data set. The first excludes all of those suppliers to edibLE16 which did not respond to the surveys, along with the percentage of local spending by people employed by edibLE16 who were not surveyed for ethical reasons. This leaves a basis of 21 suppliers which did respond with estimated percentages which are taken account of in the first approach to evaluate the R3, and which is referenced as the R3(a) and LM3(a) evaluations.

The second approach is a three step process. First, the suppliers are clustered according to their primary business offer. This gave rise to nine categories. Of these nine, one category included employed staff and the second baked goods. The first was not surveyed by choice, and no supplier from the second category responded to the surveys.

Suppliers representing the seven remaining clusters had responded to the surveys, and the reported estimated percentage of income as local spend for suppliers of each sector were used to derive the median estimated percentage. This median value of estimated percentage spend was then applied to all of those suppliers from the relevant sector which had not responded. In other words, missing values were addressed through substituting missing values by median values representative of that sector. In the report, this is the R3(b) and LM3(b) evaluation path. Each is considered in turn.

4.3.1. LM3 ratio using reported percentages: LM3(a)

For this evaluation stream – R3(a) and LM3(a) – only those suppliers which reported an estimated percentage of income spent locally (within the twenty mile boundary) are included in the calculations. While it reduces the relative proportion of R3 spending, this method uses data about which there is a higher degree of confidence in its accuracy.

Table 3 summarises the R3 spend with the 21 suppliers which estimated the percentage of income spent locally within the designated radius. The values in the R2 Local spend

column are the cumulative spend by edibLE16 with those suppliers which reported on their estimated percentage of local spend, as per the 'R2 Local' column in Table 2.

	R2 Local spend	Spend with suppliers reporting R3	% of local R2
2014 – 2015	17,258.10	10,132.04	58.7
2015 – 2016	33,073.86	15,647.81	47.3
2016 – 2017	26,319.69	12,629.02	47.9
Total	**76,651.65**	**38,408.87**	**50.1**

Table 3. R2 income for suppliers with known percentage of local spend

As Table 3 shows, constraining the evaluation to only those suppliers which responded to surveys about estimated local spend of income, spend with these suppliers comprises 50% of the R2.

Table 4 applies the values from Table 3 to summarise the amount spent locally by these suppliers. This comprises the R3(a) spend values.

Year	R2 Income	R3(a) Spend	% Local R3(a)
2014 – 2015	10,132.04	6,475.31	63.9
2015 – 2016	15,647.81	8,139.59	52.0
2016 – 2017	12,629.02	6,886.68	54.5
Total	**38,408.87**	**21,501.58**	**56.1**

Table 4. R3 Spend summary

To derive the first LM3(a) ratio, only these figures will be used. The formula for deriving the LM3 is as follows, using a worked example from the three rounds of 2014 – 2015 spend.

LM3(a) for 2014 – 2015:

$$= \quad \frac{R1 + R2 + R3(a)}{R1}$$

$$= \quad \frac{R1 \text{ (Table 1}^7) + R2 \text{ (Table 3}^8) + R3(a) \text{ (Table 4}^9)}{R1 \text{ (from Table 1)}}$$

$$= \quad \frac{21{,}639.60 + 17{,}258.10 + 6{,}475.31}{21{,}639.60}$$

$$= \quad \textbf{2.10}$$

To calculate the *additional* income generated for the economic area within a twenty mile radius of Market Harborough for every £1.00 invested, the formula is:

$$= \quad LM3 \ - 1$$

$$= \quad 2.10 – 1 \quad = \quad \textbf{1.10}$$

Therefore, for every £1.00 spent with edibLE16 in 2014, an additional £1.10 is generated for the economic area by those suppliers which reported on their own local spend. Using these variables, and the corresponding values from Tables 1, 3 and 4, Table 5 summarises the LM3(a) for each of the three financial years, and provides an overall, cumulative, LM3(a) ratio.

Year	R1	R2	R3(a)	LM3(a)
2014 – 2015	21,639.60	17,258.10	6,475.31	2.10
2015 – 2016	43,364.23	33,073.86	8,139.59	1.95
2016 – 2017	34,008.43	26,319.69	6,886.68	1.98
Total	**99,012.26**	**76,651.65**	**21,501.58**	**(Ave): 2.01**

Table 5. LM3(a) values for known R3(a) spend

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7   In Table 1, this is column 'Total R1'
8   In Table 3, this is column 'R2 Local spend'
9   In Table 4, this is column 'R3(a) spend'

The average LM3 ratio is 2.01, meaning that over the three year period, for every £1.00 invested with edibLE16, an additional £1.01 was generated for the local economic area. There is, from a return on investment perspective, a 1:1 ratio, a macro-economic version of match funding for every £1.00 spent with edibLE16.

4.3.2. LM3 ratio using sector-based assumptions: LM3(b)

The first approach excluded the missing survey responses from the evaluation. The second approach develops a method with which these missing values can be incorporated into the evaluation. The assumption is that if the median value[10] of estimated percentages of local spend can be ascertained from surveys for a given sector, then these median values may be used as proxies for the missing values of spend in that sector.

This second approach can be illustrated through an example: in the 2016 – 2017 financial year, there were seven upstream suppliers which comprise the fruit and vegetable sector (designated as 'FV'). Of these, four reported their estimated local spend, while three did not. By deriving the median reported spend, a sector median can be determined, which can then be applied to those suppliers which did *not* respond to surveys. In this example, the median value in 2016 – 2017 was calculated at 87.5% of income to that sector being spent locally. Therefore, for the three businesses which did not report their estimated local spend, 87.5% is used as a normalising assumption with which to calculate a reasonable percentage of spending locally for that sector.

The values reported by businesses will be used, and the median value will only be applied to those businesses which did not respond. By using this approach, the influence of missing values can be reduced albeit at the cost of confidence in the accuracy of the values derived.

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10 The median is the point at which there are an equal number of data points whose values lie above and below the median value. It is a preferable statistics to average (or means) which are distorted by outlying values.

Table 6 summarises the different sectors and the median percentages derived for each supplier for the 2016 to 2017 financial year.

Sector	n Suppliers reporting	Median % local spend
Alcohol	2	17.5%
Baked Goods	0	0
Dairy & Eggs	3	40%
Fruit & Vegetables	4	87.5%
ITC, Marketing & Media	2	40%
Meat & Fish	1	80%
Other (e.g. wages)	0	0
Prepared & Dry Goods	4	70%
Speciality Goods (e.g. confectionery)	1	7%

Table 6. Sector-based summary with median % local spend

To deal with the missing values for businesses which did not respond to the surveys then, these median values will be used instead in order to not lose out the contribution from these businesses. Unfortunately, as no representative of the baked goods sector responded, this method continues to exclude the contributions of this sector to the R3 spend. This means that up to five businesses which attracted a combined R2 spend over the three years of £3,274.16 have to be excluded from the calculations. It is difficult to calculate the influence this may have exerted on the R3 ratio.

In Table 7, the R3(b) calculations are summarised, to generate the LM3(b) ratio. R1 and R2 remain constant.

	R1	R2	R3(b)	LM3(b)
2014 – 2015	21,639.60	17,258.10	9,488.53	2.24
2015 – 2016	43,364.23	33,073.86	12,246.76	2.05
2016 – 2017	34,008.43	26,319.69	8,130.24	2.01

Table 7. LM3(b) values using combined known and derived median values

	R1	R2	R3(a)	R3(b)	LM3(a)	LM3(b)	Added £ (a)	Added £ (b)	Suppliers Reporting % local spend	Supp
2014 – 2015	21,639.60	17,258.10	6,475.31	9,488.53	2.10	2.24	1.10	1.24	17	
2015 – 2016	43,364.23	33,073.86	8,139.59	12,246.76	1.95	2.05	0.95	1.05	21	
2016 – 2017	34,008.43	26,319.69	6,886.68	8,130.24	1.98	2.01	0.98	1.01	18	
Total:	99,012.26	76,651.65	21,501.58	29,865.53	NA	NA	3.03	3.30		

Notes:

R1 = Initial spend with edibLE16

R2 = edibLE16 spend with local suppliers within 20 miles of Market Harborough

R3 (a) = Upstream suppliers reporting percentage of income spent within twenty miles of Market Harborough

R3 (b) = Upstream suppliers to edibLE16 with known and attributed median percentage spend by sector

LM3 (a & b) = Ratio of initial income to upstream local spend (higher means more money remains in local economic area)

Added £ (a & b) = Additional money to the economic area as a result of spending with edibLE16

NB:

R1 is ALL income to edibLE16

R2 is ALL **local** spend regardless of whether or not the R3 spend is known

R3 has been calculated for known local spend (traditional method) [R3(a)] and has derived values for missing values in sectors where median percentage can be calculated

4.4. Interpretation of findings:

The findings from this evaluation are considered from two perspectives. The first concerns the management of data, including missing values; and the second reflects on the nature of the supply chain and the influence of this on the LM3 ratio.

4.4.1. Data Management:

Like all research, the LM3 evaluation is only as useful as the quality of the data it works with. In the instance of the LM3 evaluation, two approaches were taken to deal with missing values from non-responses to the R3 surveys with upstream suppliers.

The first of these (the 'a' stream) derived the LM3 ratio solely by using the values returned in the surveys. Across the three years, values for the R3 spend could be derived in this way with reference to the suppliers who reported their own spend. As has been shown (see Table 5), over the three years, the known R3(a) spend equates to 28% of the R2 spend. Put differently, over the three years, less than half the number of suppliers (~43%) generated an average of an additional £1.01 for every £1.00 spent with edibLE16. This is a significant contribution, considering that the survey response rate constrained the values that could be included in the calculations.

The second approach (the 'b' stream) to dealing with missing values used the median percentages of spend by sector as proxies for the missing data. This permits the businesses which did not respond to surveys to still be included in the calculations, but at the cost of decreasing confidence in the accuracy of the findings.

The rationale of the LM3 method is to track the efficiency of initial investments through a defined geographic area. By doing so, the multiplier effect of the initial (R1) investment through the system is demonstrated. In the case of initial spending with edibLE16, whether through grant funding or customer sales, and whether the evaluation uses only known values or a combination of known and derived proxy values, the result is a positive contribution to the local economic area to the value of an additional £1.01 for every initial £1 invested, which, when factoring in missing values, increases to £1.10 for every £1.00.

In terms of interpreting the LM3 ratio itself, especially with respect to seeking strategies to optimise this, it is useful to bear in mind that the minimum value of the ratio is 1.00 and the maximum is 3.00. The average for both approaches used here is 2.01 and 2.10 respectively, so while it is indeed possible to increase the value of the ratio, it should also be recognised that it is already quite healthy.

Having said this, one also needs to identify whether the ratio generated is constrained due to sampling effects or is constrained by the extent of local (R3) spending. In the present evaluation, the distinction between the R3(a) and R3(b) values is reflected in a corresponding increase in the LM3(a) and the LM3(b). One would expect this: a greater proportion of the R2 spending is, in turn, being spent locally, and in turn this increases the value of the ratio.

Therefore, to improve the value of the LM3 ratio, it is recommended that the sampling strategy is reviewed so that the response rate among suppliers is increased. More responses lead to a more accurate analysis of how much of the R2 income stream is being spent locally. An entire sector, the baked goods suppliers, was excluded because no representative value could be attributed to account for the missing values. Moreover, as noted, this evaluation decided against surveying edibLE16 staff due to risks of reducing respondent anonymity. However, in future evaluations, an alternate decision might be taken, especially considering the amount of R2 spend that was attracted in wages. To improve the value of the ratio then, the first step would be to review the surveying method and the number of responses received.

Unfortunately, evaluations rarely deal with perfect data sets, and inevitably some data will continue to be missing. One potential approach to increasing response rates is to ask suppliers at the point where they are signing up to edibLE16 detailed questions about their estimated percentage of spend within the local area. Because businesses are already providing details, and have a vested interest in becoming part of the edibLE16 supply chain, this is likely to be an opportune time to gather the data. These can be periodically confirmed, but are likely to remain relatively consistent over time.

4.4.2. Nature of the edibLE16 supply chain:

The economic area of interest is a twenty mile radius of Market Harborough. This extends to Rugby in the south west, Leicester city to the west, along with a significant portion of north western Northamptonshire. The decision about the radius was predicated on the range within which edibLE16 deliver orders to customers, and is therefore the source area for R1 spending.

From evaluations of the R3 spend, that is, the percentage of local spend by edibLE16's own suppliers, the fruit and vegetable sector reported the highest median percentage of local spend consistently across the three years. In 2014 to 2015, the fruit and veg R3 median value was 82.5%, in 2015 to 2016, this went up to 90%, and in 2016 to 2017, it dropped to 87.5%.

This can be usefully contrasted with the lowest median percentage for local spend, the speciality goods sector. Across the same three year period, the median percentage of local spend was 7%, which then for the next two years rose to 11%. The only comparable sector was that producing and selling alcoholic beverages, which across the same period began at 17.5%, rose to 20% in the 2015 to 2016 year, and dropped again to 17.5%.

These are summarised in Table 8 across the three sectors representing the range of R2 spend.

Year	Median Alcohol Sector	Median Speciality Goods Sector	Median Fruit & Vegetable Sector
2014 – 2015	17.5%	7%	82.5%
2015 – 2016	20%	11%	90%
2016 – 2017	17.5	11%	87.5%

Table 8. Highest and lowest R3 median percentages by sector

The nature of the sector itself appears to be the primary influence on the range of median R3 percentages summarised in Table 8. While fruit and vegetables draw on very few additional components, and are sold onto edibLE16 without any further processing, items such as alcohol and speciality goods, such as confectionery, are more heavily processed. As a result, the percentage of local spending for fruit and vegetable suppliers is considerably higher, in some cases reported as 100% because the stock was grown in the gardens of small-scale suppliers. The draw from outside of the twenty mile radius is therefore significantly less than for those producers and suppliers of alcohol and speciality goods, which must buy ingredients from outside of the local area.

There is very little that can be done about this from edibLE16's perspective if they want to continue to offer customers a wide range of goods. However, it is worthwhile keeping in mind that the LM3 ratio will be influenced by what can be sourced from within the designated area and what requires importing from outside of that boundary.

This may be counter-balanced by the amount of R2 income that is attracted by different sectors. From the available data, excluding the amount spent as wages, the R2 spend attracted by those suppliers which responded to surveys is 70% of all R2 spend (£34,408.87 of £54,614.65). When this is broken down by sector, the sectors which attracted the most R2 spend were the fruit and vegetable sector (19.95%), the prepared and dry goods sector (19.35%), and the ICT, media and marketing sector (15.8%). By

comparison, the speciality goods sector attracted only 2.02%, while the 'other' sector (miscellaneous and once off payments) only attracted 0.82% of the R2 spend. It is evident therefore that the sector which attracted the most R2 spend is also the sector which reported the highest median percentage of local spend, while the sector that attracted the least R2 spend, also reported the lowest median percentage of local spend.

This pattern reflects a supply chain that is strongly biased towards keeping initial investment within the bounded twenty mile radius. Should future evaluations be undertaken, and should there be a higher response rate to surveys, it will be of interest to explore whether this pattern is maintained. By collecting multiple data points, a pattern can be determined which may then inform strategic decisions about any steps to be taken to influence the ratio of R2 spending to local R3 spend. Unfortunately, on the basis available in the present evaluation, this has not been possible to calculate.

5. Recommendations:

Recognising that the LM3 is an indicator, not a precise metric, the utility of the evaluation concerns how it can inform decisions about performance strategy. How might knowing and understanding the significance of the LM3 ratio help inform decisions to improve the ratio? The value of the ratio spans 0 to 3, with 3 being the highest ratio that can be returned meaning that 100% of the R1 spend is spent, in turn, at the third round (R3). On the basis of this, where should action be taken in the supply chain to improve the ratio, and finally, is it worth the effort?

One immediate recommendation is that future iterations of this method consider whether or not to include surveys of staff. This would enable almost 30% of the R2 spend to be included in the R3 evaluation which, in this study, was excluded due to ethical concerns.

A second recommendation would be to trace the *actual* productive boundary from which edibLE16 completes customer orders. This is anticipated to be significantly smaller than the twenty-mile boundary selected for the current evaluation. This may also offer insight into market opportunities and saturation across different sectors of the food and drink supply chain. In turn, this insight might also be leveraged having a bearing on future LM3 evaluations.

A third recommendation is to design the process through which businesses become members of edibLE16's supply chain to pro-actively include data that will be relevant for future iterations of the LM3 survey. Likely candidate fields would include a breakdown of typical business expenses, from supply chains to support and service provisioning. At this stage, businesses wishing to join edibLE16 can provide an estimated percentage of local spend as a condition of their joining, along with an agreement to routinely provide annual updates around the anniversary of their year-end submissions. This would enable

evaluation updates to be conducted with lower evaluator overhead and the collection of a historical track record for pattern analysis and for improvement planning.

The value of the LM3 ratio will be influenced by the number of R3 suppliers which respond to surveys, and the degree to which the responses to the surveys can be standardised. Changes to the quantity and the quality of data collected will change the accuracy or representativeness of the ratio returned.

6. Conclusions:

Based on the macroeconomic theory of the so-called multiplier effect, the LM3 ratio tracks the effectiveness of initial income through a defined economic area by measuring indicatively how long the initial income remains within the economic system. As such, the LM3 is a ratio that is to be interpreted indicatively, *not* as a precise metric.

The evaluation follows three rounds of spend, hence the LM3, from the initial R1 investment, through to the spend by edibLE16 with its suppliers (R2), and in turn, the percentage of R2 suppliers' spend within the local economic area (R3). The formula for calculating the ratio is to sum all three rounds of spend, divided by the R1 spend, and to derive the additional income generated through the initial spend, the LM3 ratio subtracts 1, and the balance is equivalent to the indicative additional income to the economic area.

In the present evaluation of the economic multiplier due to investing with edibLE16, the overall effect is positive. That is, through investing in edibLE16, there is a net added benefit to the local economic area defined as a twenty mile radius of Market Harborough of between £0.95 to £1.24, depending on the way that the missing values from the R3 spend are managed.

Two methods for managing missing values has been detailed here. The first constrains the evaluation data solely to those R3 suppliers which reported their estimated percentage spend locally. The second used the reported values to derive sector-specific median percentage values, and then applied these proxies to the missing data.

Due to the low numbers of staff employed by edibLE16, and in the interests of preserving confidentiality, staff were not surveyed for the percentage of their own local spend. As a result, approximately £22,000 was excluded from the R3 calculations. In future iterations of

this evaluation, this methodological decision may be something to reconsider. If so, then it is also strongly recommended that suppliers to edibLE16 are engaged in the process ahead of the actual planned date for evaluation to ensure that a higher number of suppliers return surveys on their estimated percentage of spend, which will also have an influence on the resulting ratio.

Finally, and to reiterate, the LM3 returns an indicator only. It is not intended to be a precise metric, but rather illustrates a tendency or a direction of travel. With sufficient data points, it can be useful in helping to inform the strategic optimisation of supply chain dynamics, and even here, presented as a snapshot across three financial years, it still illustrates the significant efforts deployed by edibLE16 to invest in the local economic area.

7. References:

Cabinet Office (2012) *Public Services (Social Value) Act 2012*. HM Government, United Kingdom. Available at: http://www.legislation.gov.uk/ukpga/2012/3/pdfs/ukpga_20120003_en.pdf.

Edwards-Jones, G., Milà i Canals, L., Hounsome, N., Truninger, M., Koerber, G., Hounsome, B., Cross, P., York, E. H., Hospido, A., Plassmann, K., Harris, I. M., Edwards, R. T., Day, G. A. S., Tomos, A. D., Cowell, S. J. and Jones, D. L. (2008) 'Testing the assertion that "local food is best": the challenges of an evidence-based approach', *Trends in Food Science & Technology*, 19(5), pp. 265–274. doi: 10.1016/j.tifs.2008.01.008.

H.M. Government (2011) *Localism Act 2011 (c.20)*. UK.

HM Treasury (2003) *Appraisal and Evaluation in Central Government*. HM Government, United Kingdom. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf.

Kellou, I. and Supagro, M. (2014) 'Alternative Food Systems : The Case of Agri-food SMEs', in *Proceedings in Food System Dynamics and Innovation in Food Networks*, pp. 155–160. Available at: http://centmapress.ilb.uni-bonn.de/ojs/index.php/proceedings/article/view/387/384.

Sacks, J. (2002) *The money trail*. London: New Economics Foundation & The Countryside Agency.

SERIO (2012) *The value of the community food sector: An economic baseline of community food enterprises*. Plymouth: Plymouth University. Available at: www.serio.ac.uk.

Tovey, H. (2009) '"Local Food" as a contested concept: Networks, knowledges and power in food-based strategies for rural development', *International Journal of Sociology of Agriculture & Food*, 16(2), pp. 21–35.