

Insight to Business

Part One:

To analyse the issue of transport availability for delivery of materials to customers.

Part Two:

Analysis of the Businesses Sustainability.

Visiting Tutor: Peter Mills

Student Name: Anthony Ashby

Student ID Number: 12031300

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Part One – Company Project

Business Description

Founded in 2011 by Mr S Pack, Specialist Spreading Services (SSS) is a rapidly growing young business based in the North of Kent. SSP acts as the R and T Liming representative across the county of Kent, operating as an independently run company, undertaking all sales and spreading responsibility. SSP is a run by its founder who operates it as a sole trader.

Specialist Spreading Services is a unique business offering a range of precision spreading operations across the county of Kent. Operations include, GPS sampling and mapping of soil pH; GPS variable rate application of lime and fertilizer across grassland, arable, orchards and vineyards, besides the most recent addition to the services offered, of compost spreading in orchards and vineyards.

Machinery List:

- 2008 Fendt 716 with loader and GPS Auto Steer.
- 2006 Bredal (K85) 10 tonne GPS variable rate lime spreader with stainless steel body and weigh cells. Able to spread fertilizer.
- 2006 New Holland TN75NA?? Orchard tractor with super-steer.
- 2012 Landrive 4 tonne GPS variable rate orchard lime spreader.
- 2013 Bogballe L1 GPS variable rate orchard fertilizer spreader.
- 2014 Kirkland Orchard compost spreader.
- 2015 28 foot 19 tonne low loader trailer.
- 2005 5m Rytec flail topper
- 2001 Mconnel PA 550

Business is generated primarily by visiting farms to generate sales. This method is used to generate fresh sales and for repeat sales with existing clients. Other methods include trade stands at conferences and shows. SSP has a good record of customer retention as well as obtaining new customers each year by drawing clients from competitors in the industry, hence the business has seen a tonnage growth from 6000 tonnes to over 10000 tonnes in 3 years. Revenue from lime sales in 2014 was also generated by S Pack taking the responsibility of the lime sales for Farm Image, previously a competitor in the industry, resulting in tonnage sold increasing to 19000 in the company's 4th year of trading.

The revenue or value of products sold onto farms has also increased from £120,000 in 2011 the companies 1st year of trading to £370,000 in 2014 the companies 4th year of trading, an increase of 300% over the 4 years.

Industry Insight

Agricultural liming has been practiced over many years and has been considered a vital part of soil and crop husbandry for many centuries as was published by Johnston (1849) who observed over 150 years ago that lime was being considered “the basis of all good husbandry”. Agricultural lime application is important for crop growth with regards to nutrient uptake, soil structure and stock health as set out by the Agricultural Lime Association (ala) (2015a); and the application of liming products was even subsidised through the 1960’s before this was removed in 1974 (University of Reading, Not dated).

Many natural quarried products are available for agricultural use including Limestone (CaCO_3), Magnesium Limestone $\text{CaMg}(\text{CO}_3)_2$ and Chalk CaCO_3 (ala, 2015) besides synthetic products such as G-Lime (Granulated Calcium Lime) as supplied by Kilwaughter Lime (2015). Due to increased costs associated with granular manufactured liming products, the vast majority of agricultural liming uses screened natural quarried products delivered in bulk. The products are generally delivered onto farm using lorries and then spread by contractors due to lime spreaders being a specialist piece of equipment that farmers are not able to justify. Good communication is therefore required to sample the ground and coordinate delivery and spreading in available operating window available between crops.

Using data from Defra (MAFF and BSFP, 2010), it has been estimated that approximately 2.5 million tonnes of lime are spread in the UK which is considerably lower than in the 1960s when lime was subsidised (Chris Dawson, Not Dated). As shown by British Survey of Fertilizer Practice (BSFP) (Appendix 1, Table 1) lime usage varies according to crop type with the crop sugar beet having the highest percentage of crop receiving a dressing (31.2%) and highest application rates (5.3t/ha), although more is spread across the combined cereal crops and grassland as both of these crop types are more abundant in the UK.

With precision farming a key focus across agriculture, liming today is becoming a more accurate and targeted operation with GPS sampling and GPS variable rate spreading using auto steer being used by the lime contractors who are pushing the industry forward. Considering lime costs approximately only £20/tonne for sampling, delivery and spreading (Pack, 2014. Pers. Comm. Mr S. Pack R&T Salesman for Kent); with the price of fertilizers having risen (peaking in 2008) to a current price of approximately £300 per tonne (HGCA, 2014; Index Mundi, 2014) and more fertilizer being used, there has never been a more important time for farmers to utilize lime to condition the soil to its optimum for each crop type to ensure efficient use of nutrients by the crop (ala, 2015b). Therefore there could be further growth in the industry as the financial benefits of liming become more apparent, and lime applications become more targeted and accurate, to fine tune and optimise soil conditions.

Internal and External Business Analysis

For full details of the analysis of the business and external influencing factors, (Including references and further information), see Appendix 2.

Specialist Spreading Services has grown substantially since starting out in 2011 and has developed rapidly year on year, as a result of being well received by farmers and on the back of good business strengths. The main business strengths are the overall quality of service provided by the company coupled with enthusiasm and drive. The determination, drive and knowledge of S Pack has been key for the development of the business. Another strength of the business is the machinery owned and used. This machinery is of high accuracy with GPS variable rate capabilities and auto steer on the main arable and grassland liming equipment; this enables a highly accurate and precise application of materials to be achieved. Similarly, using accurate GPS sampling and mapping software enables the company to carry out accurate mapping and recommendations.

Overall the main strengths are the accuracy and quality of service provided which is all driven by enthusiasm, knowledge and determination.

One weakness of the business could be said to be the irregular cash-flow within the business as a result of seasonal work with the majority of the annual cash income being obtained through the summer months, although with the development of more spring work and obtaining a wider range of machines, the cash flow irregularity is improving.

Another potential financial weakness of the business is the reliance on borrowed money to finance machinery and expand, this however currently is not a problematic weakness and is becoming less of a weakness as the business is growing rapidly with annual turnover and profits rising year on year enabling more borrowing to be carried by the business.

The main weakness with regards to the current operations of the business is the dependence on external hauliers for the delivery of lime to farms during the summer months. Lime has to be delivered at short notice, while weather conditions are fit for spreading, and with the haulage from the quarry where most of the chalk is supplied having been unreliable the last season, it is a threat to the overall success of the business. If the materials required can't be delivered quickly and efficiently within a short window of time with due to the weather or due to the pressure of drilling the following crop, the business stands to lose trade, not be able to fulfil orders and as a result lose profitability and reputation.

With regards to external factors, there are opportunities to diversify into other areas of agricultural contracting; however, with the summer season being occupied by the current liming operations, there is a limit as to how this would benefit the business without compromising the main liming season of work. Some diversification has been undertaken in 2015 with the purchase of the hedge cutter which has brought in work out of the main liming season.

Another opportunity would be to vertically diversify up the chalk supply chain and undertake the haulage of the material from the quarry to the farm, which besides reducing the reliance and risk of unreliable supplies of chalk through critical months but would increase the control and smoothness of operations through the main seasons, further improving the quality of the service provided.

There is more opportunity to further compete, sell and spread more materials onto more farms in Kent, with other competitors still operating with fair strength in some regions.

There are also some external threats in relation to this business. One of these could be the potential

legislation changes that could tighten up the UK liming industry with regards to increasing the focus on paperwork and aspects such as neutralizing values, potentially having a negative effect on the business.

There is also the issue of the weather, with chalk not being a suitable material to store outside. But there is little that can be done with regards to this to completely eliminate the risk.

A threat that is currently very real to Specialist Spreading Services, and not in the control of the business currently is that of being unable to supply chalk to farms in critical months due to a lack of transport. It has been very difficult for the business to obtain suitable transport through the summer season which is the businesses critical time, exposing it to the threat of not being able to deliver and provide the service it needs to.

Choice of issue to be addressed with justification.

The issue to be addressed further in this report is the one of the transport of materials (chalk) from the quarry to the farms. This issue is the one that is to be addressed based on the current business strengths centring in the quality of service being provided which is one of the key reasons for the strong business growth which needs to be continued; whilst the lack of security of haulage through the main liming season is putting pressure on the business and risking its reputation and further growth. Having unpredictable haulage currently poses a great threat to the business, and as there is the opportunity there to vertically diversify up the supply chain as another option to expand and increase control and quality of service, this is what will be further investigated in this report with regards to which options are available and what may or may not financially be possible.

Analysis of solution options with supporting budgets

Option 1

One option available would be just to hire an 8 wheeler tipper lorry permanently through the summer months which is the critical time and when there is enough work to occupy a lorry full time. This would not provide enough haulage for all the chalk haulage requirements, but would be a buffer if other haulage such as that normally provided by the quarry, failed, enabling some material to be delivered to keep operations moving through the summer.

Table 1. Gross Margin associated with an 8 week 8 wheeler lorry hire.

See appendix 3, Table 1 for full revenue data.

Costs		
Operator's Licence	Application for licence	£275
	Issue of Licence	£401
Lorry Hire	@ £1000 per week	£8,000
Insurance		£860
Wages		£6,000
Fuel (118ppl)	200 miles/day @ 8.4mpg	£5,132
	TOTAL	£20,668
Revenue		
Lime Haulage	3800 tonnes @ £6/tonne	£22,800
	TOTAL	£22,800
	Profit/Loss	£2,132

(Source: Adapted from Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Long, 2015. Pers. Comm. Mr C. Long Llynch Haulage Manager)

As can be seen by table 1, there is potential for this option to make a slight profit during the summer months, so it could be said that as it would help with the pressure of haulage by having some stability, whilst breaking even or even making a small profit as shown could be possible, this option could be suitable. However there is only a small margin and if weather conditions caused a week of being unable to tip lime then the figures would not add up and a loss could be made. Besides the actual financial figures shown above, a value would have to be put on the security of having some guaranteed haulage all summer which could prevent costs of the spreaders having downtime and therefore make it more justifiable to hire a lorry.

Option 2.

Another option would be to purchase an 8 wheeler tipper lorry in order to haul as much lime as could be done with one lorry throughout the year, besides hauling all the compost requirements through the spring. There would still be some reliance on other hauliers through the summer when a

lot of lime needs to be hauled, but this could cover a good part of the summer requirements and all haulage requirements through the rest of the year. There would be quiet times through the year when other external work would be required to keep the lorry working as it would need to. There are 2 purchase options available including purchasing new and second hand as seen below. All repayment durations are over 5 years (60 months).

Table 2. Gross Margin associated with purchase of a new 8 wheeler (32 tonne) tipper in the first year. See appendix 3 Table 2 and 3 for full revenue data.

Annual Costs Year 1		
Deposit for Lorry	10% Deposit	£12,625
Finance Repayments	12 months @ £2139.97 inc R+M Contract	£25,679.64
Drivers Salary		£25,000
Operators Licence	Application for licence	£275
	Issue of Licence	£401
Insurance		£3,500
Fuel (118 ppl)	Based on 30,000 miles per year	£19,156
	TOTAL	£86,636.64
Annual Revenue Year 1		
Lime haulage	5000 tonne @ average of £6 per tonne	£30,000
Compost Haulage	3000 tonne @ £6.50 per tonne	£19,500
Other External Work	10 Weeks @ £2500 per week	£25,000
	TOTAL	£74,500
	Profit/Loss	-£12,136.64

(Source: Adapted from Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

Table 3. Gross Margin associated with purchase of a new 8 wheeler (32 tonne) tipper in the second year onwards. See appendix 3 Table 2 and 3 for full revenue data.

Annual Costs Year 2 Onwards		
Finance Repayments	12 months @ £2139.97 inc R+M Contract	£25,679.64
Drivers Salary		£25,000
Insurance		£3,500
Fuel (118 ppl)	Based on 30,000 miles per year	£19,156
	TOTAL	£73,335.64
Annual Revenue Year 2 Onwards		
Lime haulage	5000 tonne @ average of £6 per tonne	£30,000
Compost Haulage	3000 tonne @ £6.50 per tonne	£19,500
Other External Work	10 Weeks @ £2500 per week	£25,000
	TOTAL	£74,500
	Profit/Loss	£1,164.36

(Source: Adapted from Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

As can be seen from table 2 above, there are a lot of costs involved with the running of a lorry, requiring a lot of revenue to balance it, resulting a forecasted loss as shown of over £12,000. The main reason for this as can be seen from table 3 below is due to the initial costs, mainly the deposit

with a potential small profit being made in year two onwards based on the figures used. The revenue forecast to come in has been based on what the lorry could haul throughout the year which would not be all the material the company requires due to much of the material being required in a short period in the summer when other haulage would also be needed to transport lime. The revenue forecast is also based on 10 weeks of external contract haulage work which would have to be found during the quiet months. This could be difficult to get resulting potentially in a loss in year 2 also, but equally, if more external work could be obtained, the profit could look healthier. Another consideration when looking at these figures is that the repayment figures would be greater than the depreciation for the lorry, and therefore at the end of the 5 years when fully purchased, the lorry would still hold potentially a considerable value to the business.

Table 4. Gross Margin associated with purchase of a second hand 8 wheeler (32 tonne) tipper in the first year. See appendix 3 Table 2 and 3 for full revenue data.

Annual Costs Year 1		
Deposit for Lorry	10% Deposit	£3,500
Finance Repayments	12 months @ £525 per month	£6,300.00
Drivers Salary		£25,000
Operators Licence	Application for licence	£275
	Issue of Licence	£401
Insurance		£3,500
Fuel (118 ppl)	Based on 30,000 miles per year	£19,156
Repairs and Maintenance		£5,500
TOTAL		£63,632.00
Annual Revenue Year 1		
Lime haulage	4750 tonne @ average of £6 per tonne	£28,500
Compost Haulage	3000 tonne @ £6.50 per tonne	£19,500
Other External Work	10 Weeks @ £2500 per week	£25,000
TOTAL		£73,000
Profit/Loss		£9,368.00

(Source: Adapted from Autotrader Trucks, 2015; Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

Table 5. Gross Margin associated with purchase of a second hand 8 wheeler (32 tonne) tipper in the Second year onwards. See appendix 3 Table 2 and 3 for full revenue data.

Annual Costs Year 2 Onwards		
Finance Repayments	12 months @ £525 per month	£6,300.00
Drivers Salary		£25,000
Insurance		£3,500
Fuel (118 ppl)	Based on 30,000 miles per year	£19,156
Repairs and Maintenance		£5,500
TOTAL		£59,456.00
Annual Revenue Year 2 Onwards		
Lime haulage	4750 tonne @ average of £6 per tonne	£28,500
Compost Haulage	3000 tonne @ £6.50 per tonne	£19,500
Other External Work	10 Weeks @ £2500 per week	£25,000
TOTAL		£73,000
Profit/Loss		£13,544.00

(Source: Adapted from Autotrader Trucks, 2015a; Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

The figures are slightly better with regards to the purchase of a second hand lorry as shown in the tables 4 and 5 above. The deposit is smaller so less difference is seen between year one and the following years. With regards to the costs, the finance repayments are much lower than that of a new lorry; however the repairs and maintenance costs will be higher due to the age of the vehicle. This is reflected also in the amount of lime it is forecast to haul as more downtime would be expected with an older lorry than a new one, therefore revenue from lime transport is reduced. But overall there is profit shown based on the figures used, which as with the new lorry could vary depending on how much external contract work could be obtained. With £13,544 profit being shown for year 2 onwards, there is room to obtain 5 weeks less external work before a loss is being made. Once the lorry is owned after 5 years, there will be less value in the lorry than with the new lorry. With a second hand lorry there is the potential for more downtime, and a value would have to be put on running a new lorry with little downtime which could be valuable through the summer against a cheaper second hand lorry that is less reliable.

Option 3.

Option three is to purchase an artic lorry (44 tonne) with a short aggregate body for manoeuvrability on narrow lanes and on farms. This would have more capacity to haul more lime and could account for more of the summer haulage than an 8 wheeler, and could cover all the other haulage requirements throughout the year also. With an artic, through the quiet times of the year it may be easier to find external work as they are more versatile with the option to buy different trailers to cover all types of haulage. With regards to the short wheelbase aggregate body, there are few second hand ones available and so as this is a relatively small part of the cost of the outfit it would be bought new. The tractor unit however could be bought second hand and new and so costings for both will be carried out below.

Table 6. Gross Margin associated with purchase of a new artic (44 tonne) with aggregate body in the first year. See appendix 3 Table 4 and 5 for full revenue data.

Annual Costs Year 1	Notes	
Deposit for Tractor Unit	MAN TGX 26.440 (10% Deposit)	£9,790.20
Tractor Unit Finance Repayments	12 Months @ £2630.52/month inc R+M Contract	£31,566.24
Deposit for Trailer	10% Deposit	£2,500
Trailer Finance Repayments	12 Months @ £487.50	£5,850
Drivers Salary		£25,000
Operators Licence	Application for licence	£275
	Issue of Licence	£401
Insurance		£4,600
Fuel (118 ppl)	Based on 35,000 miles per year	£22,321
	TOTAL	£102,303.44
Annual Revenue Year 1		
Lime haulage	7000 tonne @ average of £6 per tonne	£42,000
Compost Haulage	4000 tonne @ £6.50 per tonne	£26,000
Other External Work	10 Weeks @ £3000 per week	£30,000
	TOTAL	£98,000
	Profit/Loss	-£4,303.44

(Source: Adapted from Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

Table 7. Gross Margin associated with purchase of a new artic (44 tonne) with an aggregate body in the second year onwards. See appendix 3 Table 4 and 5 for full revenue data.

Annual Costs Year 2 Onwards	Notes	
Tractor Unit Finance Repayments	12 Months @ £2630.52/month inc R+M Contract	£31,566.24
Trailer Finance Repayments	12 Months @ £487.50	£5,850
Drivers Salary		£25,000
Insurance		£4,600
Fuel (118 ppl)	Based on 35,000 miles per year	£22,321
	TOTAL	£89,337.24
Annual Revenue Year 2 Onwards		
Lime haulage	7000 tonne @ average of £6 per tonne	£42,000
Compost Haulage	4000 tonne @ £6.50 per tonne	£26,000
Other External Work	10 Weeks @ £3000 per week	£30,000
	TOTAL	£98,000
	Profit/Loss	£8,662.76

(Source: Adapted from Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

As can be seen by table 6, in the first year of purchasing a new artic lorry, a loss would occur, even based on obtaining 10 weeks external work above the requirements of the direct materials haulage for the business. Year 2 onwards could see a potential, relatively small profit made as calculated by the figures above. This small profit however would be a relatively poor return on the investment and not be sufficient to ride out many extra costs or poor years; as if 1000 tonnes less of lime were hauled then that would reduce the profit to £2662.76. To obtain the external work it may also be necessary to purchase a different trailer in order to get enough work which would be an extra cost, and if just 3 weeks of the assumed 10 weeks of external work was lost, then the enterprise would be making a loss.

There are however opportunities with this outfit with regards to purchasing different trailers to access other markets at quieter times of the year for example haulage of grain or straw, which potentially opens the door to a new enterprise of dealing in these commodities. With more regular and profitable work linked directly to the business in the quieter times of the year; meaning the business could utilize the lorry all year for itself and rely less on outside work; there could be the potential for the gross margin to look a lot healthier. All these options would be a large opportunity cost if an 8 wheeler was purchased as diversification by purchasing different trailers is not an option, which makes an artic much more versatile.

Table 8. Gross Margin associated with purchase of a second hand artic lorry (44tonne) with a new aggregate tipping body in the first year. See appendix 3 Table 4 and 5 for full revenue data.

Annual Costs Year 1	Notes	
Deposit for Tractor Unit	2008 VOLVO FM FM480 6X4	£3,210.00
Tractor Unit Finance Repayments	12 Months @ £625.95/month	£7,511.40
Deposit for Trailer	10% Deposit	£2,500
Trailer Finance Repayments	12 Months @ £487.50	£5,850
Drivers Salary		£25,000
Operators Licence	Application for licence	£275
	Issue of Licence	£401
Insurance		£4,600
Fuel (118 ppl)	Based on 35,000 miles per year	£22,321
Repairs & Maintenance		£4,900
	TOTAL	£76,568.40
Annual Revenue Year 1		
Lime haulage	6600 tonne @ average of £6 per tonne	£39,600
Compost Haulage	4000 tonne @ £6.50 per tonne	£26,000
Other External Work	10 Weeks @ £3000 per week	£30,000
	TOTAL	£95,600
	Profit/Loss	£19,031.60

(Source: Adapted from Autotrader Trucks, 2015b; Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

Table 9. Gross Margin associated with purchase of a second hand artic lorry (44tonne) with a new aggregate tipping body in the second year. See appendix 3 Table 4 and 5 for full revenue data.

Annual Costs Year 2 Onwards	Notes	
Tractor Unit Finance Repayments	12 Months @ £625.95/month	£7,511.40
Trailer Finance Repayments	12 Months @ £487.50	£5,850
Drivers Salary		£25,000
Insurance		£4,600
Fuel (118 ppl)	Based on 35,000 miles per year	£22,321
Repairs & Maintenance		£4,900
TOTAL		£70,182.40
Annual Revenue Year 2 Onwards		
Lime haulage	6600 tonne @ average of £6 per tonne	£39,600
Compost Haulage	4000 tonne @ £6.50 per tonne	£24,700
Other External Work	10 Weeks @ £3000 per week	£30,000
TOTAL		£94,300
Profit/Loss		£24,117.60

(Source: Adapted from Autotrader Trucks, 2015b; Fleet News, 2015; GOV.UK, 2015; RHA, 2013 and Pack, 2015. Pers Comm Mr S Pack R+T Salesperson Kent).

As can be seen in tables 8 and 9 above, purchasing the tractor unit second hand increases the profit substantially, causing it to more than double that of purchasing a new one. Repairs and maintenance costs are higher than that of a new lorry and less material has been forecast to be hauled due to a reduced reliability with a an older lorry; but these costs do not add up to the amount the repayments have reduced for a second hand lorry. Therefore overall costs are reduced and with revenue only slightly reduced from that generated by the new lorry, the profits are much higher with a gross margin of £19,031.60 in the first year and £24,177.60 for year two onwards.

Again there are all the opportunities with a second hand artic as were with the new one with regards to diversifying using the lorry and an assortment of trailers.

One note to make is, the lorry will be delivering material to fields a lot of the time and therefore a short trailer for manoeuvrability is required, but also as is the spec of the second hand tractor unit, a double drive (6x4) would be recommended for more traction to minimise the risk of getting stuck. The tractor new unit used for the gross margin calculation for a completely new lorry was not a double drive, which would not be ideal and could add potential costs to increase the specification to that.

Conclusions

Option one of hiring a lorry potentially could work as could at least break or make a small profit and provide some guaranteed haulage for the summer, however the margin for it paying for itself is only small, and the £8000 hire charges could be used to finance a lorry which after 5 years the company would still have. Also this would not provide haulage for the rest of the year and would just ease the pressure in the summer. It is an option possibly if finances couldn't stretch to purchasing a lorry but would not financially be the best option.

Option two of purchasing a lorry would be a preferred option to option one as this would be available all year for haulage and there is potential to make a profit and have more control over haulage with constant access throughout the year with the businesses own lorry. This option would not work purchasing a new lorry as there is not enough predicted revenue to support the repayments, and not enough profit even in year 2 onwards to justify the expenditure. But with a reasonable profit achievable by purchasing a second hand lorry, this would be the best option with regards to hiring or purchasing an 8 wheeler both from a convenience point of view being able to haul all year, have more control and is financially more sustainable.

Option 3 is similar to option 2 in that purchasing a new artic lorry is not financially viable. However, purchasing a second hand tractor unit in conjunction with purchasing a new trailer is the most financially viable option overall, showing a reasonable profit of £24,000. This option also has the benefit of offering more opportunities to employ the lorry in quiet times by purchasing other trailers to obtain more work and even diversify the business to make use of the lorry all year round. An artic would also be more attractive than an 8 wheeler in the fact that the one artic unit, not costing a great deal more than an 8 wheeler can haul more material in a season, increasing the security of haulage for the business and minimising the reliance on other hauliers. Overall this option, purchasing a second hand tractor unit and new trailer is the most satisfactory.

Recommendations

It is recommended that out of all the options explored above, an artic lorry should be purchased to cover the majority of the business haulage requirements through the year. This would be recommended based on the fact it would have potential to make a profit for the business besides reducing the risk of downtime in the summer due to lack of haulage. The tractor unit should be second hand, in order for the business to be able to service all the repayments and make a profit. The tractor unit should also be a double drive unit (6x4) to ensure maximum traction for tipping in fields. The trailer unit should be bought new, and be a short, triple axle aggregate trailer to minimise compaction in fields and maximise manoeuvrability in narrow lanes, gateways and farmyards. All finance repayments should be over 5 years. Care should be taken to ensure the business can cope with extra costs and monthly finance repayments of owning a lorry, as without the external work, the lorry would not make a profit, and the business should consider if it could cope with this occurring or ensure the work was obtained. With regard to the timing of the purchase of the lorry, it would be best to purchase it at the beginning of the summer at the end of June as there is guaranteed work hauling lime for the next three months to bring money in early on. It would also be recommended to purchase the lorry towards the end of the VAT quarter so that the VAT paid on the deposit can be reclaimed as soon as possible to aid cash flow.

Part Two –Sustainability

To operate sustainably is to operate in such a way as to consider the future in the actions and ensure things how we know them continue for the following generation. Specialist Spreading Services is a new business with an overall good ethos towards sustainability, always trying to adopt best practice when on farms.

With regards to economic sustainability, the business is young and so for operations to be viable and sustainable is of high importance. The business strives to obtain more work and be more competitive to generate more revenue and profit. To do this it has invested in GPS variable rate equipment and Auto steer on tractors in order to improve efficiency and offer a competitive advantage as a way to fuel growth. This precision farming also improves the economic sustainability on farms by ensuring that there is no surplus (waste), or deficit of products within the soil thus improving supply chain efficiencies by reducing production costs and maximising crop performance. Customer car and promotion using informative leaflets is also a method used to ensure the retention of customers and attract new customers in order to maintain the economic standing and improve the finances to ensure the business continues to thrive. This is important, as loyal regular customers are necessary for the business to have a good financial standing, and new customers are necessary to ensure the growth of the business. Diversification is also key to Specialist Spreading Services operating in a financially sustainable way. So far the main diversification has been to invest in orchard spreading equipment to maintain work throughout the year, mainly in the spring when the main arable work is quiet. This has improved cash flow greatly, giving the business a more secure financial standing, and enabling the exploitation of other areas of crop production and generate more income. With regards to purchasing a lorry as set out in this report, again this is a form of diversification and as can be seen has the potential to generate more income and profit for the business. But this also will minimise downtime and improve the efficiency of the service provided by having more control so will potentially reduce the cost of downtime as well as generating an income; thus improving the economical sustainability of the business.

Environmentally, Specialist Spreading Services has a good ethos with regards to sustainability. Soil is what the business activities function around, with the sustainability of soils being a main objective by applying the exact amount of product to maintain them and keep them balanced for more productive cropping. The machinery that the business operates is another main the business is operating in an environmentally responsible way. This is due to the use of GPS for both the mapping and the spreading with the use of auto steer; this ensures maximum accuracy for precision application, and no waste of the resources being spread besides providing the optimum amount of product for the soil as it changes. Compaction of soils is an issue, and the orchard equipment is on comparatively narrow tyres in order to keep the width down for vineyards which is not good for compaction. However the larger arable machinery is run on large tyres for minimal compaction of soils. The main use of fuel is in the larger Fendt tractor, and while this is not that new so not as economical as others as does not use ad blue as is now used more, it is economical for its age and is on a Vario transmission gearbox which minimises fuel use. With regards to the lorry purchase, this would not be an environmentally friendly vehicle to run with a relatively poor mpg. However as the only way to get products to farms, it is necessary and by purchasing one the business will have more ability to deliver products on time to ensure the soils get what they need at the right time in what is often a short window for spreading lime between harvest and drilling the next crop.

With regards to social sustainability, the business is strongly focussed on good customer care and satisfaction in order to retain customers and attract more through a good reputation. Quality of service is key which is a vital part of customer care and building a good reputation. Employee care is also good with sufficient training and support and acceptable working conditions. The company expects workers to work long hours at seasonable times, but this is usual for the agricultural industry and therefore is acceptable. The local community benefit from the business as tradesmen in the local area are used for services such as repairs and parts; this retains money in the county and provides support for local businesses. If a lorry were purchased, this would provide another job in the local community, injecting more money out of the business and into the county. The nature of the lime which is spread by the company is very dusty and can create a significant dust when spread which can blow a considerable distance; this can be of annoyance to people nearby and potentially is a hazard for people with breathing problems. This issue can't always be avoided, but the business strives to only spread products when the weather conditions are suitable and when winds are low to minimise the drift of the dust. Also the transport of the main product lime involves a lot of lorry haulage through quiet villages and down small lanes which can result in congestion and disturbance, this issue is hard to avoid as the product needs to reach the farms and the most suitable route is always used. If a lorry was purchased, this issue would potentially become more directly linked to the business.

Overall, the business operates around maintaining the sustainability of soils and has a good overall ethos which leaves few areas that could be improved on.

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Appendix 1

Table 1: Use of Lime Great Britain 2013.

	Crop area receiving dressing (%)						Average application rate (tonnes of product/ha)						Fields in sample	
	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All	Ground limestone	Ground chalk	Magnesian limestone	Sugar beet lime	Other	All		
Spring wheat	2.4	0.2	0.8	-	-	3.3	3.7	2.6	5.0	-	-	4.0	13	157
Winter wheat	2.7	0.8	0.8	-	0.0	4.3	4.4	6.0	4.5	-	2.5	4.7	52	1208
Spring barley	5.9	0.4	1.1	0.3	3.1	10.9	4.0	4.9	5.0	2.5	0.5	3.1	95	879
Winter barley	2.3	0.5	0.9	-	0.7	4.5	3.2	5.0	6.8	-	0.8	3.8	20	374
Oats	4.7	1.2	-	-	0.4	6.2	3.1	11.6	-	-	1.7	4.6	19	242
Rye/triticale/Durum wheat	-	-	-	-	-	-	-	-	-	-	-	-	1	9
Potatoes (seed or earlies)	-	-	-	-	-	-	-	-	-	-	-	-	0	20
Potatoes (maincrop)	-	-	-	-	-	-	-	-	-	-	-	-	0	87
Sugar beet	5.1	7.7	0.5	16.8	1.0	31.2	6.2	3.2	5.0	6.0	5.0	5.3	33	117
Spring oilseed rape	1.5	2.2	-	-	0.6	4.3	4.1	5.0	-	-	2.5	4.4	5	85
Winter oilseed rape	6.3	0.8	0.7	0.6	-	8.4	4.2	7.1	5.0	6.1	-	4.7	40	450
Linseed	-	-	-	-	-	-	-	-	-	-	-	-	0	46
Forage maize	5.4	0.9	0.3	-	0.1	6.7	3.7	4.1	4.4	-	5.0	3.8	18	190
Rootcrops for stockfeed	14.2	-	6.8	0.4	1.3	22.6	5.2	-	4.1	5.0	0.5	4.6	15	70
Leafy forage crops	7.8	1.2	1.8	-	6.3	17.0	4.6	3.4	5.9	-	1.9	3.7	11	52
Arable silage/other fodder crops	18.0	0.6	0.3	-	2.8	21.7	4.2	3.4	5.0	-	1.6	3.8	15	74
Peas - human consumption	-	-	-	-	-	-	-	-	-	-	-	-	3	36
Peas - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	1	25
Beans - animal consumption	-	-	-	-	-	-	-	-	-	-	-	-	4	134
Vegetables (brassicaceae)	-	-	-	-	-	-	-	-	-	-	-	-	4	19
Vegetables (other)	-	-	-	-	-	-	-	-	-	-	-	-	2	52
Soft Fruit	-	-	-	-	-	-	-	-	-	-	-	-	2	22
Top Fruit	-	-	-	-	25.6	25.6	-	-	-	0.4	0.4	-	6	33
Other tillage	-	-	-	-	-	-	-	-	-	-	-	-	1	47
All tillage	4.3	0.9	0.7	0.5	1.0	7.4	4.2	5.4	4.9	5.6	0.7	4.0	360	4428
Grass under 5 years old	4.2	0.1	0.5	-	0.8	5.6	4.3	4.8	5.1	-	1.2	3.9	86	1003
Grass 5 years and over	1.6	0.0	0.5	-	0.3	2.4	4.1	3.1	3.1	-	1.0	3.5	91	2375
All grass	2.0	0.0	0.5	-	0.4	3.0	4.1	3.6	3.4	-	1.1	3.6	177	3378
All crops and grass	3.0	0.4	0.6	0.2	0.7	5.0	4.2	5.3	4.2	5.6	0.9	3.9	537	7806

(Source: British Survey of Fertilizer Practice, 2013)

Appendix 2

Current business analysis – SWOT Analysis

INTERNAL		
POSITIVE	STRENGTHS	WEAKNESSES
	<ul style="list-style-type: none"> ➤ Good overall knowledge of agricultural industry. ➤ Good knowledge and understanding of soils, pH and liming industry. ➤ High spec machinery, most accurate in region. ➤ GPS Auto-steer spreading. ➤ Ability to sample using GPS. ➤ Young, enthusiastic, passionate. ➤ Wide range of spreading abilities. ➤ Competitive within the industry. 	<ul style="list-style-type: none"> ➤ Cash flow tighter at times due to seasonal work. ➤ High monthly fixed costs. ➤ Irregular annual income due to seasonal work. ➤ Reliance on hauliers for lime supply. ➤ Lack of labour through summer months. ➤ Reliance on finance and borrowed money for purchases.
	EXTERNAL	
	OPPORTUNITIES	THREATS
	<ul style="list-style-type: none"> ➤ Further expansion in Kent (further south into competitors strongholds) ➤ Expansion into another region. ➤ Diversification – site clearance, hedge cutting/maintenance ➤ Expand up supply chain – haul and deliver lime in summer, compost in winter. ➤ Research and development trials with highly specialist machines – funding for research. 	<ul style="list-style-type: none"> ➤ Competitors ➤ Legislation changes ➤ Arable farm profitability falling (grain prices falling) ➤ Fruit farm profitability falling (fruit price falling) ➤ Lack of hauliers for supply of lime during critical months. ➤ Poor weather during critical spreading months through the summer.
		NEGATIVE

Analysis of external business factors affecting the UK liming industry.

Business

- Grain prices are currently low compared to 2008 and 2014, and have fallen through 2014 which could lead to less profitable arable farms and a reduction in lime use, particularly if prices stay low (Farmers Weekly, 2015; Nasdaq, 2015). If they rise however, this could increase the use of lime.
- With both beef prices and milk prices currently low (Farmers Weekly, 2015; Dairy Co, 2015) beef and dairy farmers profits are being squeezed which could greatly reduce the use of lime across grassland, which accounts for the largest area of agricultural land in the UK (Defra, 2014). If livestock farming becomes more profitable, in future years an increase of lime use could be seen across grassland, but this is currently looking less likely.
- Fertilizer use has increased with intensification of agriculture as shown by the agricultural industries confederation (2014) and Defra (2011) and with fertilizers (particularly nitrogen) lowering soil pH (CropNutrition.com, 2013a; Hardy, 2008) this could result in more lime

needed to rectify more soil acidity and improve the soil condition to cope with the extreme rainfall.

- Weather Patterns are becoming more variable with more extreme weather patterns and more extreme rainfall being seen across the UK (Fred Pearce, 2014). This could speed up the movement of lime through the soil profile, speeding up leaching resulting in soil pH falling faster (CropNutrition.com, 2013b)
- As seen in Appendix 1 Table 1, sugar beet is the crop with highest percentage receiving a dressing of lime and highest application rates. Considering this with the fact the sugar beet industry has seen yields increase by 60% in 30 years and crop area decreased by 90,000 hectares (48%) in 30 years as shown by British Sugar plc and NFU Sugar (2011), with potential for these efficiencies to decrease land area in production further, this could result in a further reduction of lime use in this sector.
- Availability of liming material can affect each liming season and vary from year to year as the bulk natural products have to be quarried, screened and stockpiled, which can only be done with dry material in many cases. So depending on supply meeting demand, there is a risk of being a lack of supply.
- Haulage is a key part of the liming industry with haulage needed to supply the material to farm. Some materials such as screened natural chalk can't be stockpiled in fields regularly through the summer in readiness for spreading at a later date as if it gets wet it is will not spread. Therefore haulage is needed, often at short notice to haul material as it is being spread according to the weather.

Political

- If regulations set out by the EU as described by the Agricultural Liming Association, (2015c) are implemented in the UK which so far they haven't been, this could increase the legislation controlling the liming industry potentially detrimentally affecting it with changes such as having to state for all lime sales or reports to customers the liming product, the neutralizing value and the micron of sieve the product has passed through (Dooome, 2015. Pers. Comm. Mr R. Dooome Technical and Financial Director Industrial Mineral Association Europe, Speaker at Calcifert Agricultural Lime Conference 2015).

Economic

- With cost of production relatively high in comparison to poor prices, particularly on arable farms at present (Taverner, 2014), this could lead to a reduction in profits or even losses on farms resulting in less spent on crop inputs and liming causing a reduction in lime use. Similarly, in prices rise and costs are kept the same, this could lead to greater profits and more inclination to spend on liming, even liming ground that is only slightly acidic, resulting in an increase of use of lime.
- With the current interest rates low at just 0.5% (Bank of England, 2015), this reduces the cost of borrowing, resulting in more farms investing and expanding, potentially generating more profits and increasing the demand for lime.

Social

- Current agricultural educations are including more emphasis on the importance of soil condition and soil structure as is lectured at Harper Adams University. Soil structure is vital to sustainably farm, produce good consistent plant growth and hence yields (Hartley, 2014. Pers. Comm. Mr W. Hartley Soil and Plant Nutrition Lecturer at Harper Adams University), and with education increasing the awareness in younger generation farmers, in time this could lead to an increase in use of liming products to condition soil.

Technological

- Technical Advances could improve the profile of the liming industry through the increased use of GPS, variable rate mapping and spreading for accurate applications and efficient use of resources resulting in improved crop productivity (Trimble, 2015). This could increase the use of liming products across farms, especially by farmers who use GPS for other applications and know that applying the perfect amount to each part of the field is important to fine tune the soil for optimum uniform crops.

Appendix 3

Table 1. Revenue generated hauling lime during 8 week lorry hire.

Radial (Miles)	price/tonne (£)	loads/day	tonnes/day @ 19tonne/load	Revenue/day (£)	Revenue for summer (8 weeks)
1 (0-8)	5	6	114	570	22800
2 (9-16)	6	5	95	570	22800
3 (17-24)	7.5	4	76	570	22800

(Source: Adapted from: Pers. Comm. Mr S. Pack R&T Salesperson Kent.)

Table 2. Haulage rates for haulage of lime using an 8 wheeler.

Radial (Miles)	price/tonne (£)	loads/day	tonnes/day @ 19tonne/load	Revenue/day (£)
1 (0-8)	5	6	114	570
2 (9-16)	6	5	95	570
3 (17-24)	7.5	4	76	570

(Source: Adapted from: Pers. Comm. Mr S. Pack R&T Salesperson Kent.)

Table 3. Haulage rates for haulage of compost using an 8 wheeler.

Radial (Miles)	price/tonne (£)	loads/day	tonnes/day @ 17.5 tonne/load	Revenue/day (£)
1 (0-8)	5.5	6	105	577.5
2 (9-16)	6.5	5	87.5	568.75
3 (17-24)	8	4	70	560

(Source: Adapted from: Pers. Comm. Mr S. Pack R&T Salesperson Kent.)

Table 4. Haulage rates for haulage of lime using an artic

Radial (Miles)	price/tonne (£)	loads/day	tonnes/day @ 28tonne/load	Revenue/day (£)
1 (0-8)	5	6	168	840
2 (9-16)	6	5	140	840
3 (17-24)	7.5	4	112	840

(Source: Adapted from: Pers. Comm. Mr S. Pack R&T Salesperson Kent.)

Table 5. Haulage rates for haulage of compost using an artic.

Radial (Miles)	price/tonne (£)	loads/day	tonnes/day @ 25tonne/load	Revenue/day (£)
1 (0-8)	5.5	6	150	825
2 (9-16)	6.5	5	125	812.5
3 (17-24)	8	4	100	800

(Source: Adapted from: Pers. Comm. Mr S. Pack R&T Salesperson Kent.)