

Lamy Ink Pen Analysis

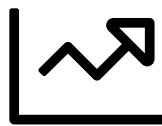
Freddie Nicholson

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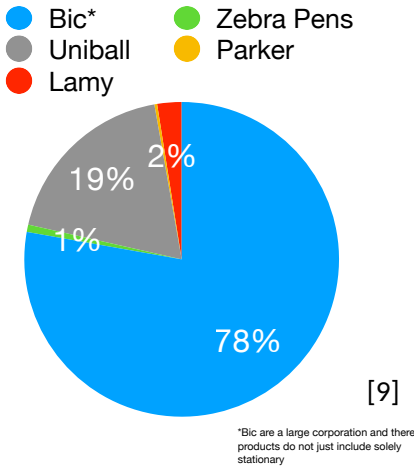
Sustainable Design Engineering
Submission 1



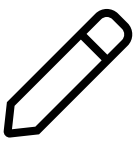
Market Analysis



In 2022, pens market valued at **£13,823 mn** and expected to rise to **£16,823 mn** in 2030 [10]



Compound Annual Growth Rate (CAGR) expected to be **2.5%** from 2022 to 2030



€1.8 billion revenue for market leader Bic in 2021

Revenue Analysis

The chart to the left shows a breakdown of global revenue from the 5 major brands shown to the right. Bic is the clear market leader followed by Uniball. Lamy and Zebra both popular in the UK yet have a much smaller revenue than the leaders.



£865,000 worth of sales from UK manufacture of ball point pens. [2]



1.6bn pens thrown away a year in the US.



Luxury pen market share 1,880mn in 2021. [1]

Market Trends



Smaller and more environmentally friendly packaging is growing in the pen sector.



Growth of digital writing tools on a mass scale replacing the requirement for a traditional pens.



Multifunctional pens

Used on a mass scale, writing equipment is one of the top consumable products used by people in their day to day lives. Aside from personal usage, many industries such as Education, Retail, Banking, Manufacturing and Construction all heavily rely on writing equipment for their day to day business.

Major Brands



LAMY A brand analysis



3-8 years just to design one pen.



All manufacturing equipment designed in house for their specific requirements.



[7] Take sustainability seriously, publication explaining action they are taking and most their products are designed to be reusable.

Key Insights

Many consumers lack brand loyalty for writing equipment simply opting for the most convenient option

~95% of most disposable pens is structural support rather than functional.

Schools and Businesses are sectors that could see the biggest change.

Personas and Consumer Research

User Journey Map

Below is the cycle a consumer typically goes through when purchasing and using a pen.

- Needed for work, exams, study.
- Old equipment has reached end-of-life (EoL)
- New features that would benefit the user.

How might we reduce the frequency of trips to the store to buy new pens.

Acquisition

How might we improve packaging to make it clear that the product is a more sustainable option?

- Used by the consumer to write for work, personal / educational reasons.
- Pen will wear over time either by running out of ink or Nib requiring replacement.
- User may wish to try other pens to experience a different feel, write on a different material or to explore other experiences.

How might we improve the lifespan of a product without adding additional cost?

- Pen will eventually reach failure.
- Parts may be replaced including Nib, Ink Cartridge, Refill.
- Entire pen may need to be replaced if disposable.
- Pen may need to be cleaned if it is reusable / checked for debris.
- Fairly clear when pen replacement is needed, e.g. visual indicator of ink level.

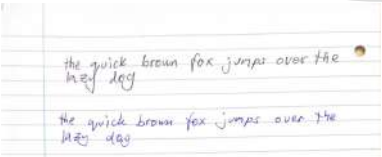
Requirement



- Either through physical retailers, online or provided through work.
- May be a consultation process but most likely picked up off shelf without much thought.
- In-Person Retailers may offer ability to try out pens against each other.



Usage



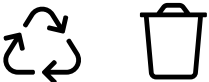
- Eventually pen will reach EoL where it can no longer be used.
- Consumer may recycle by throwing in a recycling bin or through a scheme setup by the supplier / retailer.
- Pen may be thrown into general waste leading it to head to landfill.

Maintenance



How might we reduce / adapt the physical parts within a product to create an easier repair.

Recycling / Trash



Practical Pen Try Out

Charlotte got to try out both pens that she had been asked about in the survey. Even after the test she found that she preferred writing with the Zebra pens due to their grip which the Lamy did not have.

She was actually quicker writing with the Lamy by about one second however she said she did not enjoy the experience as there was a "scratching" sensation from the stainless steel tip.

She stated she preferred having a click pen even though she realised they were less sustainable. She suggested that there could in fact be refills to work with them however quickly realised why this was a not a common option when attempting to disassemble the pen.

How might we create a recycling trade-in scheme that benefits both the consumer and the environment?

Conclusion

The current user journey map gives some clear indication where certain aspects could be improved.

Stand out issues include packaging being weak at indicating which products are more sustainable and the number of parts within some multi-pack disposable pens.

Considerate Charlotte

"Never liked fountain pens for a start. I don't enjoy the wet ink situation."

"I couldn't care for brand loyalty to my Pens. I would be happy to buy a better product if it existed."

Prefers



Reasons she would buy

- Cost
- Multi-pack
- Simple
- Writing "feel"

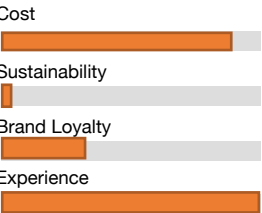
Sustainability Importance in Purchasing Decision

Not Considered (1/10)

Personal Pen



18-24 Student London



Core Needs

Charlotte requires a pen that is cheap to use and comfortable for long periods. Having a click pen experience is very important to her.

Pain Points

Finds that fountain pains have a poorer experience in comparison to her usual pens. However would be willing to try alternative solutions.

Mindful Michael

Prefers



Reasons he would buy

- Writing "feel"

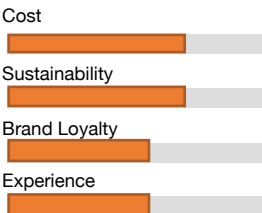
Sustainability Importance in Purchasing Decision

A consideration (6/10)

Personal Pen



18-24 Student London



Core Needs

Michael is aware of the impact of his consumable product purchases. He tries to buy sustainably but still favours convenience and cost as he is a student.

Pain Points

Struggles to decide on only one pen. Does not feel there is enough information about different features and sustainability of products.

Sophisticated Sarah

Prefers



Reasons he would buy

- "Luxury Choice"
- Simple
- Reusable
- Writing "feel"

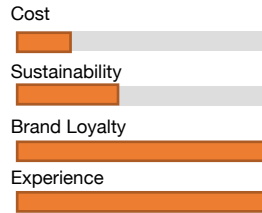
Sustainability Importance in Purchasing Decision

Not a major factor (4/10)

Personal Pen



65-74 Retired Devon



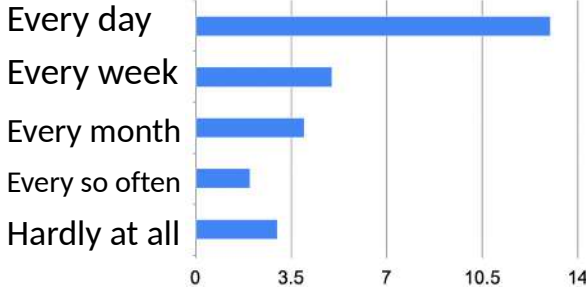
Core Needs

Sarah needs something to last and therefore does not feel sustainability is a major factor in her purchasing decision. She prefers a traditional fountain pen for its unique writing experience.

Pain Points

Sarah finds any other pen than her specific model unnatural. She does not consider cost as much as some of her pens have lasted her 15 years.

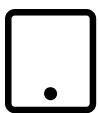
How often do you use a physical pen?



30% of participants bought a pen in the last month.



4.14/10 was the average score for how important sustainability was when buying writing equipment.



48% of participants stated they used digital inking equipment.

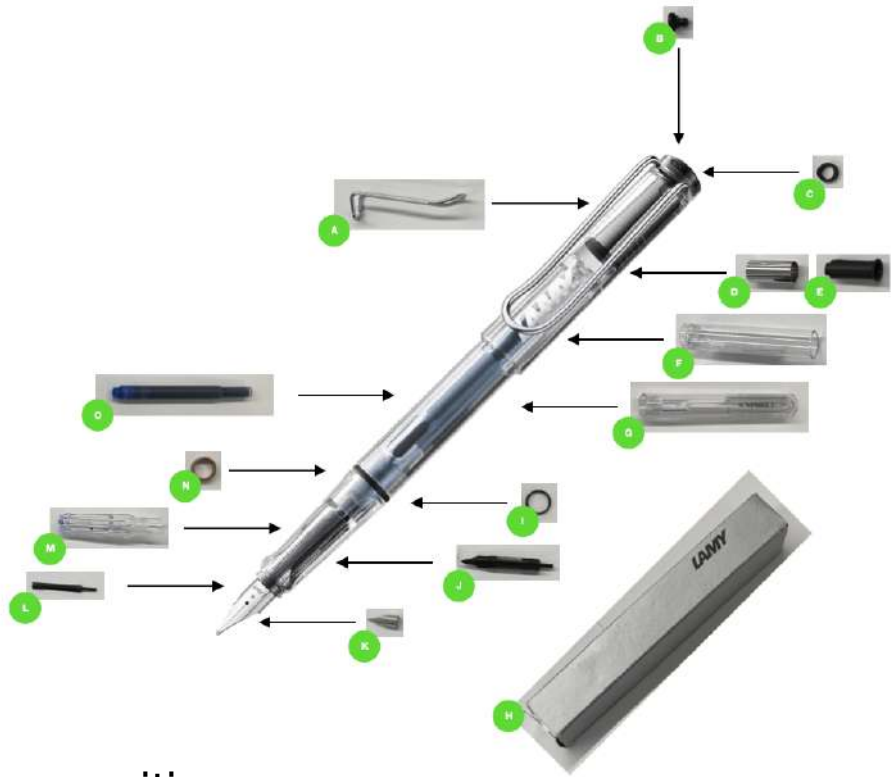
User Research Methods

Survey with 7 Design Engineering Students

Prolific Survey with 20 participants

Further In Person Practical Interview

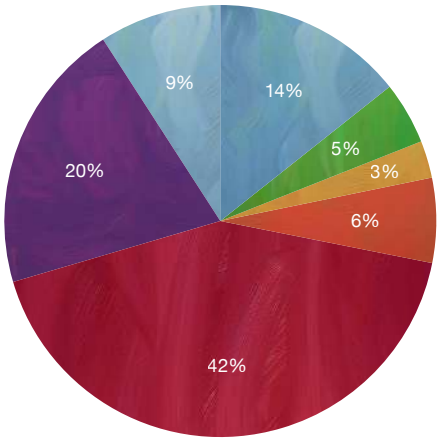
Product Teardown



Pen Composition

The chart to the right shows the overall composition of materials within the Pen. ASA, the main body plastic, is the main contributor to the weight of the product. Followed by the cardboard packaging which is not present post purchase.

- Stainless Steel
- ABS
- PVC
- Aluminium
- ASA
- Cardboard
- PE



Bill of Materials

Part	Part Name	Mass / g	Material
A	Pen Clip	3.29	Stainless Steel
B	Pen Lid Top	0.32	ABS
C	Pen Lid Top Grip	0.08	PVC
D	Pen Lid Ink Seal	1.55	Aluminium
E	Pen Lid Ink Seal Grip	0.60	PVC
F	Pen Lid	3.34	ASA
G	Pen Barrel	4.38	ASA
H	Pen Box	4.88	Cardboard

Manufacturing Process

- Nibs
 - Nibs are made from a 3ft spool of stainless steel.
 - The whole process is fully automated.
 - Once Nib is formed, placed into cutting wheel and punched.
 - Gold nibs are possible for more premium experience.
 - Visual Inspection
 - Branding - Laser etched (low eco impact)
- Ink Delivery System
 - Feeds fed into the ink delivery system.
 - Laser checks nib and feed assembly
 - Feed inserted into grip with nib.
 - Pen is inked up with temporary supply and tested.
 - Ink cartridges loaded into hopper.
- Pen Caps
 - Plastic cap inserted into cap
 - Clips done by hand
 - Cardboard spacer inserted in between pen head and barrel to prevent ink flow.
- Cartridges - proprietary (high eco impact)
 - Empty cartridges fed into machine to be filled.
 - Caps placed on automatically.
 - Machine spits out into groups of 5.
- Warehouse
 - Multistory in Germany
 - Stored in Big Boxes
 - Sent all over the world with distributors in 75 countries.



Presence of testing is present in final product. Ink was found in nib when cartridge had not been punctured.



Repair

After the teardown of the product, I needed to reassemble the pen in order to allow participants to test

The process was fairly straightforward with parts popping in to place with no adhesive.

The only tricky part was the lid of the pen which I found difficult to get it to hold together as the part had been pressed in with a lot of force during manufacture however I eventually managed to get it to work putting the pen back in original condition and giving an excellent reparability score.

Reparability Score



Materials

The pen is made up of a combination of materials that all serve their own purpose in creating the Lamy pen experience.

Aluminium



Aluminium is only used for the inner piece that holds the PVC piece to prevent ink leaking from the pen. It has likely been chosen due to its lightweight properties allowing it to be towards the top of the pen.

Stainless Steel



Stainless Steel is used for the Nib to give it increased strength in order to allow it to undergo the wear and tear that it will endure in its product life. ASA is similar to ABS apart from some chemical differences allowing for good UV resistance, impact strength and surface finish. These properties make it ideal for the main body material.

Acrylonitrile styrene acrylate (ASA)



Polyvinyl Chloride (PVC)



PVC is a flexible material that is ideal for holding parts in place. PE is ideal for the ink cartridges of the Lamy due to it being cheap to produce and lightweight.

Polyethylene (PE)



Acrylic Styrene Acrylonitrile (ABS)



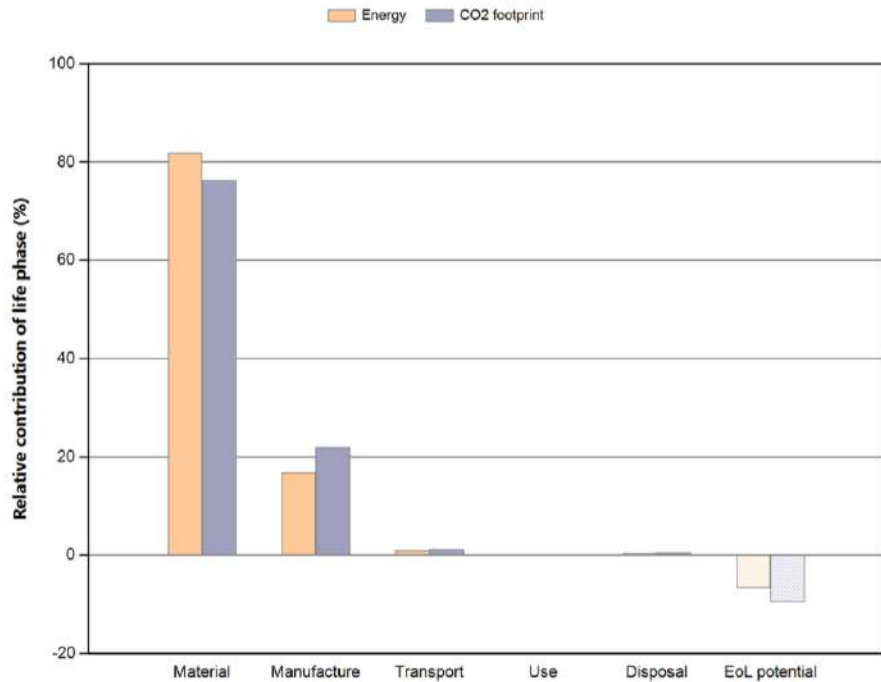
Cardboard



ABS is used for the main inking components of the main part of the pen due to its strong properties. These components are crucial to the functioning of the pen and therefore needs to be precisely moulded. The packaging components of the Lamy are made out of cardboard and very minimal, there is no included paper pamphlet apart from a sticker that is printed on the pen with detail about its configuration.

Eco Audit

Transport Breakdown



[6]

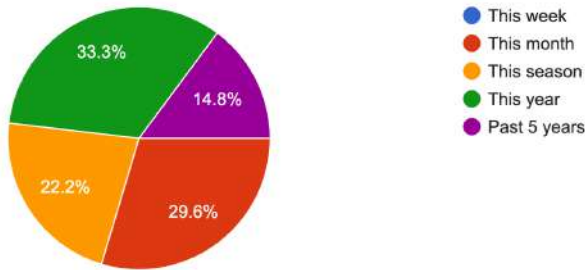
- The material components of the Pen have the biggest eco impact in the lifespan of the product. With 80% of embodied energy coming from their usage.
- The manufacturing process comes second with approximately 15% of the embodied energy coming from this process. Lamy design all their manufacturing in house allowing optimisations to be made reducing the overall energy cost.

Reuse of product

No users had bought a pen in the week they were surveyed however a significant amount had purchased one in the past month of October. However sales trends for writing equipment are likely to change with each month especially with Back to School and therefore these results may be skewed. These results show that most users are not reusing their writing equipment and instead opting for a disposable alternative.

When was the last time you bought a form of writing equipment?

27 responses



Material Sustainability Analysis

Material Breakdown

Component	Material	Recycled content (%)	Part mass (kg)	Qty.	Total mass (kg)	Energy (MJ)	%
Pen Clip	Coated steel, stainless steel,terne coated	Virgin (0%)	0.0033	1	0.0033	0.24	12.9
Pen Lid Top	ABS (medium-impact, injection molding)	Virgin (0%)	0.00032	1	0.00032	0.031	1.7
Pen Lid Top Grip	PVC (semi-rigid, molding and extrusion)	Virgin (0%)	8e-05	1	8e-05	0.0045	0.2
Pen Lid Ink Seal	Coated steel, stainless steel,terne coated	Virgin (0%)	0.0016	1	0.0016	0.11	6.1
Pen Lid Ink Seal Grip	PVC (semi-rigid, molding and extrusion)	Virgin (0%)	0.0006	1	0.0006	0.034	1.8
Pen Lid	ASA (extrusion, injection and blow molding)	Virgin (0%)	0.0033	1	0.0033	0.34	18.4
Pen Barrel	ASA (extrusion, injection and blow molding)	Virgin (0%)	0.0044	1	0.0044	0.45	24.2
Pen Box	Cardboard	Virgin (0%)	0.0048	1	0.0048	0.089	5.4
Barrel-Lid Separation	ABS (medium-impact, injection molding)	Virgin (0%)	6e-05	1	6e-05	0.0058	0.3
Ink Piece	ABS (medium-impact, injection molding)	Virgin (0%)	0.00066	1	0.00066	0.063	3.4
Nib	Coated steel, stainless steel,terne coated	Virgin (0%)	0.00021	1	0.00021	0.015	0.8
Inner Ink Piece	ABS (medium-impact, injection molding)	Virgin (0%)	0.0001	1	0.0001	0.0096	0.5
Grip	ASA (extrusion, injection and blow molding)	Virgin (0%)	0.0026	1	0.0026	0.27	14.5
Packaging Separator	Cardboard	Virgin (0%)	0.00011	1	0.00011	0.0022	0.1
Ink Cartridge	PE-MD (molding and extrusion)	Virgin (0%)	0.0022	1	0.0022	0.18	9.6
Total				15	0.024	1.8	100

*Typical: Includes 'recycle fraction in current supply'

***User-defined material

Manufacturing Breakdown

Component	Process	Amount processed	Energy (MJ)	%
Pen Clip	Wire drawing	0.0033 kg	0.082	21.6
Pen Lid Top	Polymer molding	0.00032 kg	0.0066	1.7
Pen Lid Top Grip	Polymer extrusion	8e-05 kg	0.00048	0.1
Pen Lid Ink Seal	Extrusion, foil rolling	0.0016 kg	0.011	2.8
Pen Lid Ink Seal Grip	Polymer extrusion	0.0006 kg	0.0036	1.0
Pen Lid	Polymer molding	0.0033 kg	0.071	18.7
Pen Barrel	Polymer molding	0.0044 kg	0.093	24.5
Barrel-Lid Separation	Polymer molding	6e-05 kg	0.0012	0.3
Ink Piece	Polymer molding	0.00066 kg	0.014	3.6
Nib	Roll forming	0.00021 kg	0.00075	0.2
Inner Ink Piece	Polymer molding	0.0001 kg	0.0021	0.5
Grip	Polymer molding	0.0026 kg	0.055	14.6
Ink Cartridge	Polymer molding	0.0022 kg	0.039	10.2
Total			0.38	100

Disposal Breakdown

Component	End of life option	CO2 footprint (kg)	%
Pen Clip	Downcycle	0.00012	18.5
Pen Lid Top	Landfill	4.5e-06	0.7
Pen Lid Top Grip	Landfill	1.1e-06	0.2
Pen Lid Ink Seal	Downcycle	5.4e-05	8.7
Pen Lid Ink Seal Grip	Landfill	8.4e-06	1.3
Pen Lid	Landfill	4.7e-05	7.5
Pen Barrel	Landfill	6.1e-05	9.8
Pen Box	Recycle	0.00024	38.4
Barrel-Lid Separation	Landfill	8.4e-07	0.1
Ink Piece	Landfill	9.2e-06	1.5
Nib	Downcycle	7.4e-06	1.2
Inner Ink Piece	Landfill	1.4e-06	0.2
Grip	Landfill	3.7e-05	5.9
Packaging Separator	Recycle	5.4e-06	0.9
Ink Cartridge	Landfill	3.1e-05	5.0
Total		0.00062	100

[6]

Aluminium

- CO2 footprint, primary production: 12.4 - 13.7 kg/kg
- Embodied Energy: 186 -205 MJ/kg
- Aluminium uses a lot of energy to extract.
- It is the third most abundant metal in the earths crust.
- It is one of the most cost-effective metals to recycle.



Stainless Steel

- CO2 footprint, primary production: 5.19 - 5.71 kg/kg
- Embodied Energy: 69.1 - 75.2 MJ/kg
- Stainless steel is 100% recyclable with no reduction in quality to the same material.



Acrylonitrile styrene acrylate (ASA)

- CO2 footprint, primary production: 4.63 - 5.1 kg/kg
- Embodied Energy: 96.9 - 107 MJ/kg
- ASA is not determined to be recyclable due to the added Esther that prevents UV light from damaging the pen. This is a significant downside to using ASA as it makes up the main body of the pen.



Polyvinyl Chloride (PVC)

- CO2 footprint, primary production: 4.63 - 5.1 kg/kg
- Embodied Energy: 96.9 - 107 MJ/kg
- Some flexible elements will be made made up of PVC and a plasticiser. This contaminate makes the PVC difficult to recycle.



Polyethylene (PE)

- CO2 footprint, primary production: 1.77 - 1.95 kg/kg
- Embodied Energy: 76.1 - 83.9 MJ/kg
- PE is straightforward to recycle when there are no contaminants which is the case here.



Acrylic Styrene Acrylonitrile (ABS)

- CO2 footprint, primary production: 3.41 - 3.77 kg/kg
- Embodied Energy: 88.9 - 98.3 MJ/kg
- ABS is recyclable as long as there are no contaminants. As the pen has no adhesive this ABS will be able to be recycled. To recycle the ABS, it is ground into small pellets that can be reshaped into a new product.




Cardboard

- CO2 footprint, primary production: 1.14 - 1.26 kg/kg
- Embodied Energy: 26.1 - 30.5 MJ/kg
- Cardboard and paper are very straightforward to recycle. Most consumers will be aware that these materials are recyclable and place them into a household recycling bin. This is the only packaging and a great start to making the product more sustainable,



Flow Mapper Configurator Board

Resource Specification Sheet

Resource	What is the product?	What is the component?	What is the material?
<p>This is the tangible matter that flows. Take, for example, a flow of a water bottle made from PET:</p> <ul style="list-style-type: none"> • Product: bottle filled with water. • Component: PET bottle. The HDPE/PP-cap is also a component, but it is not necessarily part of the same flow. • Material: PET 	A Lamy fountain pen	The functional components of the pen e.g. ink stream	ABS
Consumer	Which need does the product satisfy?	What is the function of the product?	Who is/are the key consumer(s)?
Choose a single consumer to specify the scenario.	Luxury, Writing Experience, Status Symbol, Elegant	Consumers can use it to write with	Sophisticated Appreciate the small details Ethical
Context	In which geographic region is the product consumed?	Where does consumption take place?	How intense is the consumption?
Define the context of the consumer. If more contexts are possible, choose one specific context. For example, decide whether your scenario involves consumption on-the-go or at home.	75 international countries	Schools, workplace, at home	Intense, will be used every single day.
Other...	<p>ges, sketches, comments, additional resources to consider...</p> <div>  <div> <p>All manufacturing equipment designed in-house</p> <p>All automated, apart from some checks by an expert</p> <p>3-8 years to design a single pen</p> </div> </div>		

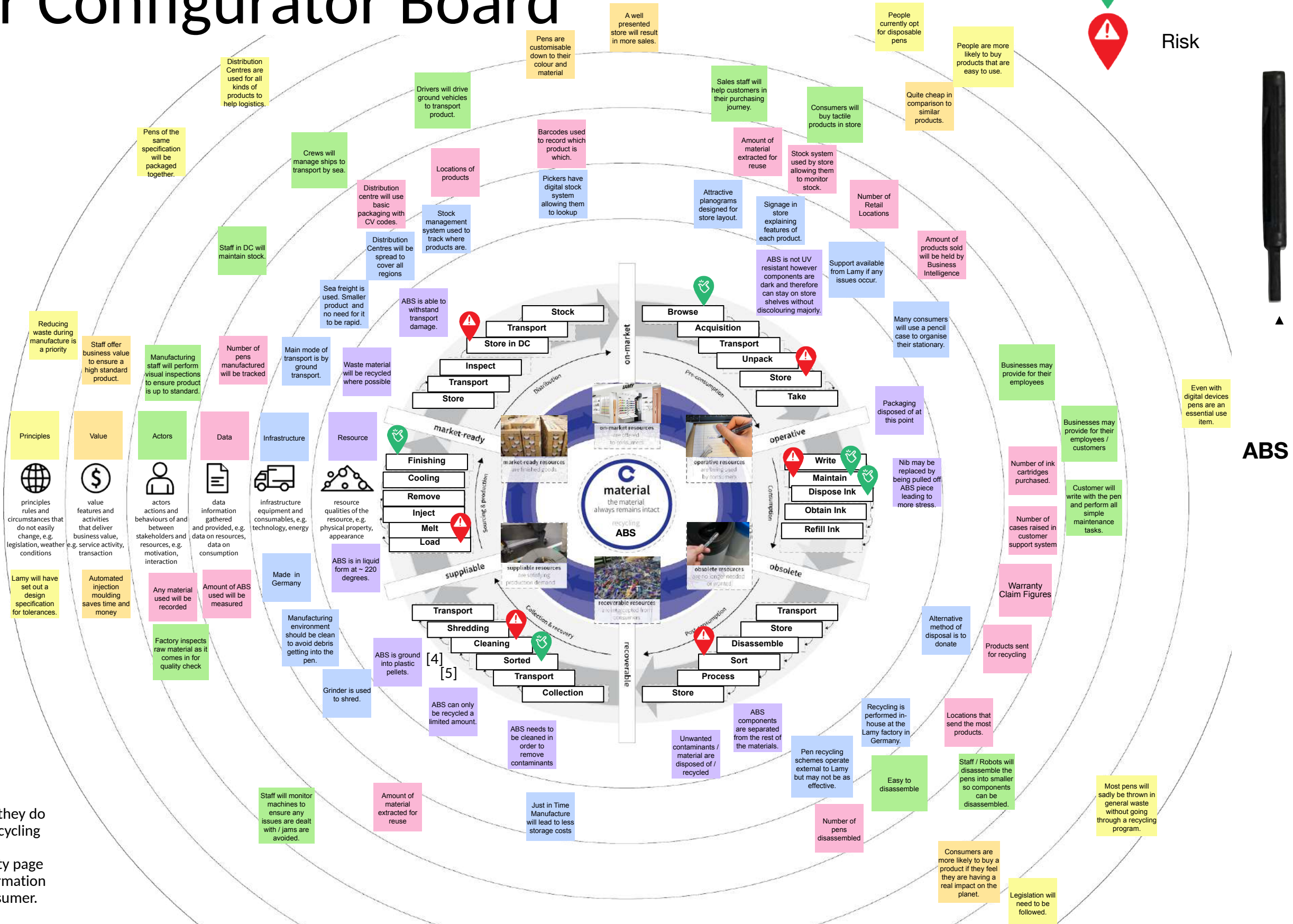


Although the packaging is basic there is no information about the materials inside the pen or any kind of link to find out more information.

The Lamy stores follow a minimalistic design with no information about how to recycle the products.



Lamy state they do in-house recycling on their sustainability page but no information for the consumer.



Flow Mapper Risk and Opportunities Analysis

Process											
	Maintain		Scope of process	Why is this process pivotal?	Relevant elements						
			Lamy's are straightforward to maintain.	Lamy has ensured that the replacement of parts in their pens is toolless and does not require instructions. A similar approach to sustainability would have a big impact.	People are more likely to buy products that are easy to use.	Consumers are more likely to buy a product if they feel they are having a real impact on the planet.	Consumers will buy tactile products in store	Support available from Lamy if any issues occur.	Number of cases raised in customer support system	Warranty Claim Figures	Nib may be replaced by being pulled off ABS piece leading to more stress.
											[4]
											[5]
Process											
	Store		Scope of process	Why is this process pivotal?	Relevant elements						
			There is a risk of storing products for too long taking up energy and resources.	Lamy has several lines of product and they will all have different levels of popularity. Trying to get manufacture towards a Just In Time process will ensure no waste energy, resources or materials (in case of discontinuation) are being used.	Staff in DC will maintain stock.	Distribution Centres will be spread to cover all regions	Stock management system used to track where products are.	Just in Time Manufacture will lead to less storage costs	Alternative method of disposal is to donate	Amount of products sold will be held by Business Intelligence	Locations of products
Process											
	Load		Scope of process	Why is this process pivotal?	Relevant elements						
			There is a risk of materials wastage during manufacture.	The loading of raw materials is when the material is in the most practical form for most machines. Beyond this point the material becomes harder to use again.	Factory inspects raw material as it comes in for quality check	Manufacturing environment should be clean to avoid debris getting into the pen.	Waste material will be recycled where possible	Any material used will be recorded	Amount of material extracted for reuse	Legislation will need to be followed.	ABS is able to withstand transport damage.
Process											
	Finishing		Scope of process	Why is this process pivotal?	Relevant elements						
			Lamy products are known for being well crafted and their bespoke manufacturing process leads to less waste.	This is the final stage before the part is placed into the final pen. It is the stage where the part will be visually inspected. Reducing the number of rejected parts and finding optimisations at this stage could bring high sustainability impact.	Manufacturing staff will perform visual inspections to ensure product is up to standard.	Number of pens manufactured will be tracked	Lamy will have set out a design specification for tolerances.	Waste material will be recycled where possible	Staff offer business value to ensure a high standard product.	Reducing waste during manufacture is a priority	Warranty Claim Figures
Process											
	Cleaning		Scope of process	Why is this process pivotal?	Relevant elements						
			Contaminants may still remain in recycled material causing complications down the line.	If contaminants cannot be removed from ABS to an acceptable level it cannot be recycled. Improving this process will result in more material being able to be recycled.	ABS needs to be cleaned in order to remove contaminants	ABS can only be recycled a limited amount.	Grinder is used to shred.	Factory inspects raw material as it comes in for quality check	Staff will monitor machines to ensure any issues are dealt with / jams are avoided.	Unwanted contaminants / material are disposed of / recycled	Waste material will be recycled where possible
Process											
	Browse		Scope of process	Why is this process pivotal?	Relevant elements						
			The browse stage is the main pivotal moment in terms of sustainability for the consumer. It is their commitment to a product.	Improving marketing towards a consumer around the sustainability of Lamy pens vs using a traditional disposable pen will hopefully boost impact at the disposal stage and result in more sales.	Consumers will buy tactile products in store	Sales staff will help customers in their purchasing journey.	Attractive planograms designed for store layout.	Support available from Lamy if any issues occur.	People are more likely to buy products that are easy to use.	Pens are customisable down to their colour and material	Signage in store explaining features of each product.

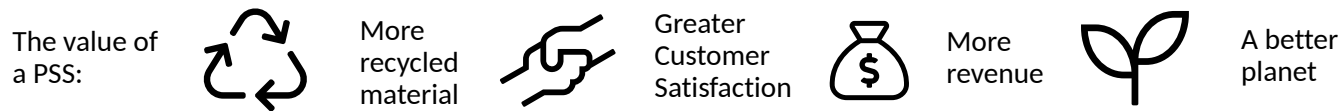
Risks & Opportunities

- The pen is made up of some materials that cannot be recycled easily such as **ASA** that makes up around **60%** of the pen.
- Users are currently shifting towards disposable pens and those that are considering the environment may have already switched to **digital alternatives**.
- There is **limited incentive** for the consumer to buy a more sustainable product if there is a higher manufacturing cost leading to a higher product price.
- The Lamy packaging is plain which is more sustainable however leads to a **lack of guidance** during buyer selection.
- Lamy cartridges are **proprietary** and incompatible with other cartridges leading to potential waste.
- Users may not be aware of **serviceable parts** within the Lamy if an issue does occur and instead buy a new pen.
- Users may **dispose** of the pen in the bin.

- Optimisations can be made to the supply chain in order to create a rapid turnaround production line with **Just in Time** manufacture reducing logistical and environmental costs.
- Lamy stores and Point of Sale fixtures can be updated to include information about the Pen's **sustainability** features.
- ASA should be swapped out for a more sustainable material alternative. Potential to use ABS but with a **swap scheme** when UV light has affected the pen.
- **Mobile applications** to help users understand how their products should be used and maintained.
- Ensuring Lamy pens are as **simple as possible** to manufacture. Are all the components necessary?
- Experimenting with one-part designs for a more **low-end refillable pen** as a disposable alternative to target education and businesses.

Through the flow mapper and risk and opportunities analysis we have now considered areas that could be targeted in the development of a more sustainable Lamy product / lifecycle.

Product-Service Systems



Current Services with Lamy



Warranty

Lamy offers a Warranty service helping prolong the lifespan of its products. This typically lasts 2 years but for eShop purchases is 3 years.

Revalorisation Services

The following schemes could be offered helping to improve product lifetime.



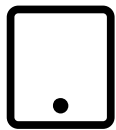
Trade-in

Trade-in schemes could be offered allowing the consumer to trade in their old pen for a discount on a new model. Additionally the pens that were trade in could be sold as refurbished models online at a cheaper price.



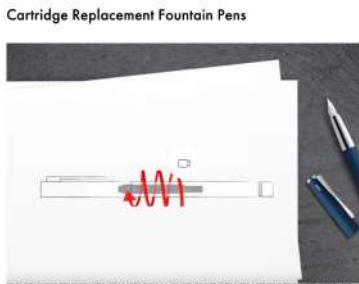
Tailored Browsing

A tool could be introduced online to help a consumer select the pen that is right for them. This is likely to introduce consumers to products they might not have considered before and will also allow Lamy to inform customers about the sustainability features of their pens.



Mobile Applications

A companion app could bring a wide range of features to Lamy pens as demonstrated by P&G with their iO bluetooth toothbrush offering. Although fundamentally the pen contains no electronics, reminders could be sent to maintain the product to prolong its lifespan.



Care

Lamy also offers care videos helping the consumer learn how to look after their pen varying from simple tasks such as replacing an ink cartridge to more complicated tasks such as converter cleaning

Existing PSS in the Sector



Bic x Terracycle

Terracycle is a scheme that allows you to recycle any brand pen. There are 375 drop off points across the UK and the closest to Imperial College is Ryman Brompton Road. The pens are collected and stored with minimal transportation to be sorted. This plastic has then be used to create benches using GovaPlast for public spaces. Drop point operators receive money they can donate to charity for each kg they collect.



Inkredible Box: Inkmeister Subscription Service

Inkredible is a subscription service in the United States that allows you to buy a pen and receive ink every month. Every month you will get a selection of samples of ink so you can see which one you prefer. At the premium level, they also include a budget pen to test the ink before using in your preferred pen. At the premium level you also get a full bottle of ink.



Pilot Begreen Recycled Marker Pen

Pilot offers refillable marker pens that can have ink refills purchased separately removing the need to buy another pen. The refills are considerably cheaper than buying a new pen and come in a range of colours. They are made from 91% recycled plastic (excluding consumables). The quality of the product is still outstanding and there is no detriment to the consumer for opting for the sustainable option.



Imperial College London Library iPad Rental Scheme

Imperial College London Central Library offers an iPad rental scheme for students allowing them to borrow digital devices for two weeks. This means students do not need to maintain their own devices and will have a relatively new device. There is no cost to the service however a writing accessory is not included and a student would need to source this themselves if they wanted to use this.



Bic ECOLutions Ballpoint Pens

This pen is sold in bulk and is made from 74% recycled plastic. The packaging states 97% as it has small print excluding the ink cartridge. They have partnered with 1% for the planet a scheme that requires companies to donate 1% of their annual sales to environmental organisations. The shipping of the pens in a multipack will result in less waste due to shipping costs for individual pens. However the pens are still disposable and will need to be recycled at the end of their life.



eBay Pen Second-Hand Market

eBay is well known for being a well established market leader in the online marketplace. In the writing sector, pens across all ranges are listed on eBay and sold. Generally prices are cheaper than the market rate. Products which would have been likely to go to landfill are instead sold on to another customer reducing waste.

Product-Service Systems - Insights and Opportunities

Insights



A

Offices often provide stationary for their employees in bulk

B

Schools often provide a stationary list to students

C

Packaging can be repurposed

D

Consumers often don't mind purchasing a used item if it comes with a price cut

E

Alternative materials can be used instead of hard to recycle plastics

F

Manufacturing can be replicated locally to save on shipping costs

G

Customers are aware of the right to repair movement

H

Inks can be toxic and harmful to the environment similar to textile dyes

I

Physical material failure is one of the main reasons products will be discarded

J

Consumers are only likely to upgrade to a sustainable alternative if it is the same price in this market

K

Subscription boxes have become more embedded in our culture with Subscribe and Save through Amazon

L

Customers enjoy being able to customise their products.

M

There is a current lack of awareness around the sustainability of pens at the purchasing stage

N

Rental schemes are becoming increasingly popular with higher cost of living

O

Multipacks are currently the most popular consumer purchase option for stationary

P

Most consumers are happy to download an app for their products when they unbox

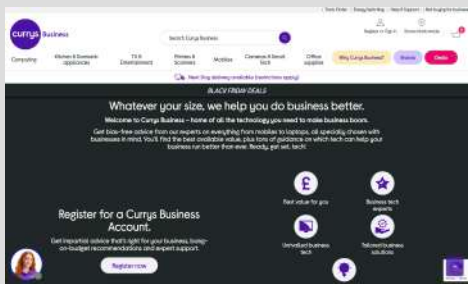
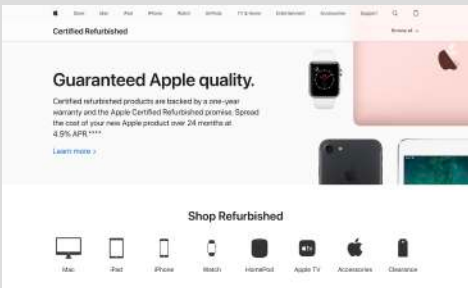
Q

Lamy has limited direct stores across the globe leading to untrained sales staff.

R

There is no direct recycling scheme offered to the consumer for Lamy

- Creating packaging that is pulp based and more minimal could be beneficial. Lamy pens are already packaged in minimal cardboard packaging with a barcode applied. Pens could be stored in pulp packaging in bulk in store and the customer handed the pen unboxed. The packaging could then be reused for another unit. Sticky barcode labels could be substituted for more efficient RFID labels that could be easily reused for different products.
- Creating an app that shares the care routine for Lamy products would be a great start to reducing pen wastage due to poor maintenance. Oral B has executed this well with their new line of toothbrushes that alerts the consumer when they need to replace their brush head. Additional potential for electronics but danger that this could become a gimmick and decrease the sustainability of the product.
- Selling refurbished products that have been rejected by previous customers could lead to significant cost savings and less wastage. Components could be replaced such as the pen body to give a like new feel. This would likely need to be done by hand but large companies have managed to create robots such as Apple's Daisy that can disassemble iPhones. Similar could be applied to Lamy pens.



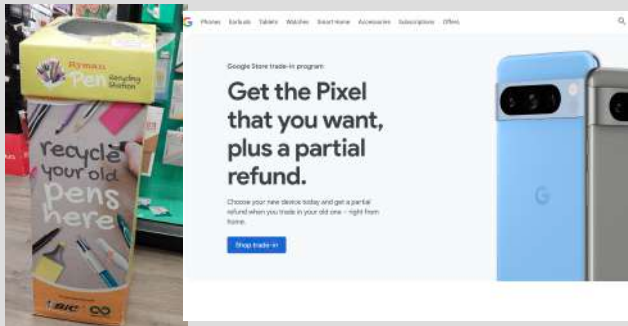
Opportunities

- Consumers find that is hard to visually tell if a product is made out of a sustainable material. A natural paper feel conveys that the product is sustainable. Utilising the same Lamy authentic design whilst being made out of a strong paper material will lead to a new special edition pen that will likely sell very well towards all segments of the market.



- More visual disposal and trade-in schemes will result in less products going to landfill. TerraCycle is currently very limited and Lamy does not offer their own program. Ideally partnering with competitors to make a unified recycling bin where each product will be sent to the respective company would be the best scenario.

[3]



- B2B is a large sector that could have massive impact on sustainability if pitched in the right way. Incentives and offers could be offered on large purchases of sustainable products to increase adoption. Advertising could also be tailored to promote more sustainable pens. Certain businesses such as schools could be further incentivised as these are likely to have more impact with back to school.

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