Feasibility study of 3D Printing Chocolate at the industrial scale by : Declan Schell K00266613

Aim of the Project

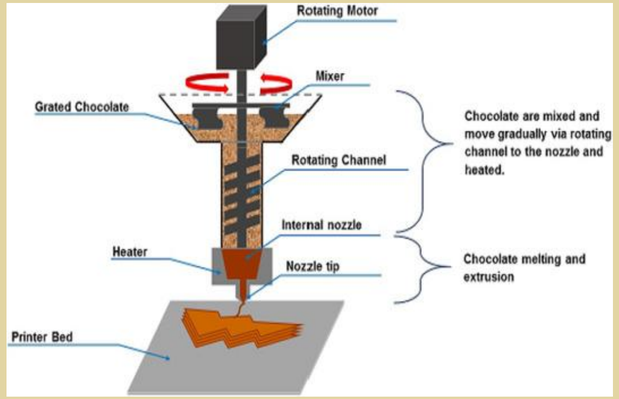
The aim of this project was to see if it is feasible to set up a hybrid chocolate factory in which 3D printing is included to reduce single use plastics in the industry

Background

Chocolate products

- This dissertation covers the feasibility of 3D printing chocolate while looking at the material properties as well as evaluating the impact of temperature control, additives and structural integrity. The dissertation incorporates cases studies feasibility studies to help get a better understating on where the technology is and where it needs to move to before it becomes a viable option

Methodology



Cross section of a chocolate 3d ink jet printer

- Due to the limited application of industrial scale chocolate 3d printers the methodology information that was collected was collected via
- Feasibility studies was carried out to evaluate the cost of the equipment as well as personal skills that would be required to set up a hybrid factory
- Case studies were carried out to see what research was done in the field around printing
- Survey to evaluate the current market for Food 3d printers

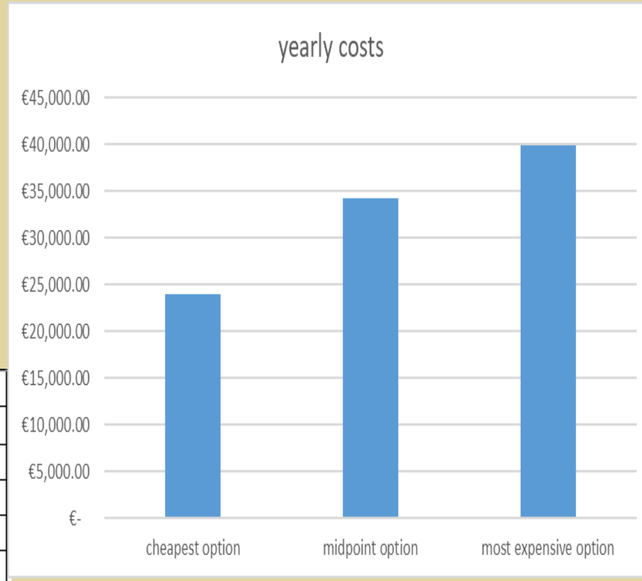
Results

- Due to the high contrast in equipment available there was a large gap in the cost of equipment
- From the data collected it we were able to create a calculator allowing companies to see if their chocolate formulations would print

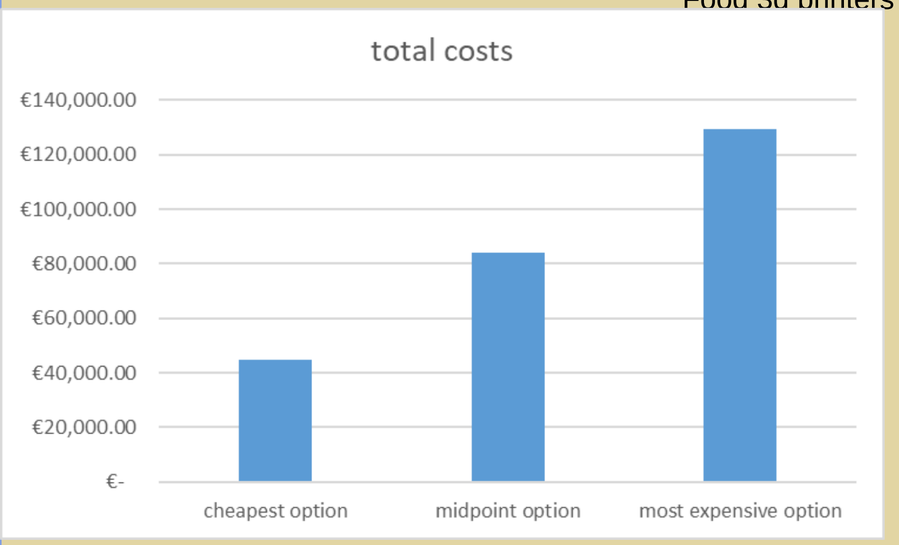
Conditions	printing values	Printing Status
pre heat (°C)	48	**Okay to print**
time (Min)	10	**Okay to print**
working temp (°C)	34	**Okay to print**
cocoa content (%)	52	**Okay to print**
cocoa butter (%)	33	**Okay to print**
milk fat (%)	5	**Okay to print**
rate of heat (per min)	2	**Okay to print**
rehology	50	**Okay to print**
printing speed (mm/s)	50	**Okay to print**
		Print

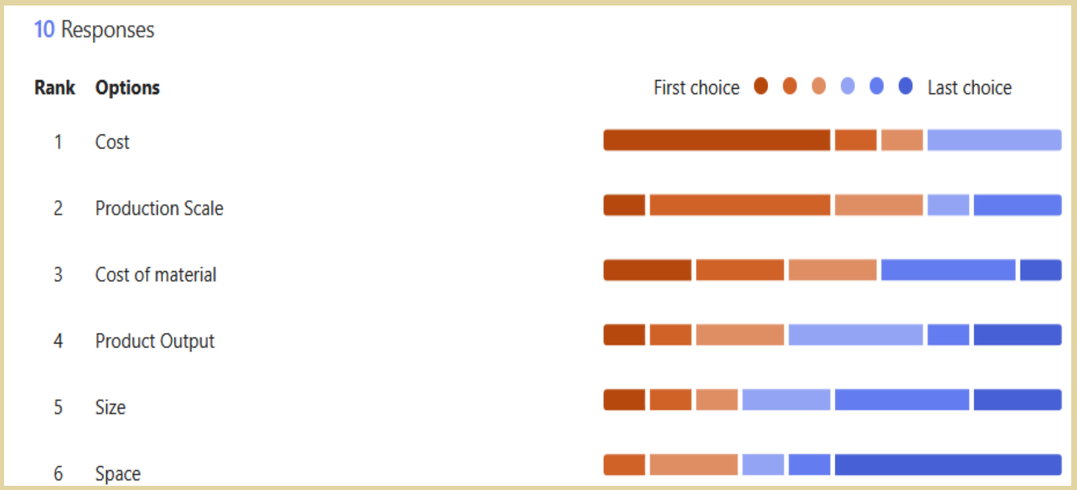
Snip of the excel calculator

- Data from the surveys showed that companies would be willing to invest in the equipment as long as their key interests were meant which were focused on machine out put as well as the cost



Cost comparison of equipment needed for a chocolate factory





Survey Results showing what companies view as the most important qualities for a 3D chocolate printer

Conclusion

Due to the current capabilities of food 3D printers in the industry investment in the technology is low however as seen from surveys there is an interest in the technology if product out put would be able to match current out put levels

Solutions

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