# Assignment Cover Sheet

PLEASE NOTE THE DEADLINE FOR ALL BUSINESS SCHOOL COURSEWORKS IS **3pm**

**PLEASE ENSURE YOU COMPLETE BOTH SECTIONS OF THE FORM AND ATTACH IT ALL TO THE FRONT OF YOUR WORK**

PART A – To be kept attached to coursework

| Surname | First Name | Module Title | Module Code |
|---|---|---|---|
| Meriacri | Victor | Management with an I.T Enviroment | BIO0216-1819 |

| Student Number | Tutorial Group No | Taught by (Tutors Name) / Supervisors Name |
|---|---|---|
| U1768775 | | Juliet Quarmby |

| Course | Assignment Title |
|---|---|
| ICT | Individual Essay |

Unless you have been notified otherwise, this coursework must be submitted through turnitin by **10am** on the given hand-in date.

It is YOUR responsibility to print Assignment Coversheets for manual submissions.

You are advised to keep a copy of all your assignments for personal reference.

Word Count: 2905

Date Submitted: 12/04/2019

Date Due: 05/04/2019

I confirm that this assignment is wholly my own work unless otherwise clarified and that I have read and understood the regulations in the context of academic misconduct. (please tick box) ✓

Signed:
……Meriacri……
……

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PART B – To be kept in the Department

| Surname | First Name | Module Title | Module Code |
|---|---|---|---|
| Meriacri | Victor | Management with an I.T Enviroment | BIO0216-1819 |

| Student Number | Tutorial Group No | Taught by (Tutors Name) / Supervisors Name |
|---|---|---|
| U1768775 | | Juliet Quarmby |

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|---|---|
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Students are reminded of University Regulations for its awards. In the context of hand-in deadlines for assessed coursework, Regulation E1.5 (Sept 09) states that if a student fails to submit assessed work by the agreed submission date (after allowing for any extensions that might have been granted), the Course Assessment Board will record a mark of zero, leading to failure in the assignment, unless the Board is satisfied that there are good grounds for treating the student differently. E1.6 focuses on extenuating circumstances and procedure.

In the context of academic misconduct, the University's regulations are contained in Section 4 of the Students' Handbook of Regulations (Sept 09). These give details of what constitutes plagiarism and the penalties for plagiarism. In signing the box below you are confirming that you have read and understood the regulations concerning hand-in deadlines, extenuating circumstances procedures and plagiarism.

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…Meriacri…….
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Sbusteams/Student Support/courseworks/ 1112/assignment cover sheet 1112

# Small Robot Company
# Deloitte Predictions & Strategic Analysis

Farming is a field of humans' activity that remains in the past. Farmers are still using hundred years technologies to feed the population. Small Robot Company, a British agri-tech start up knows that the future is in AI and robots. Their small robots proved to be much more efficient and ecological than big tractors. Compared to big agriculture machines, small and precis robots have a 90% lower energy output, use 95% less pesticide, produce 90% less CO2 and even increase the amount of usable space. The revolutionary idea of using AI and precision of robots to improve the efficiency of farming and minimising chemical use, made the Small Robot Company become one of the most recognised brands in AgriTech.

Deloitte Predictions

Deloitte Global predicts that in 2019, companies will accelerate their usage of cloud-based Artificial Intelligence (AI) software and services. Among companies that adopt AI technology, 70 percent will obtain AI capabilities through cloud-based enterprise software, and 65 percent will create AI applications using cloud-based development services (Deloitte Insights, 2019). Small Robot Company has won their financial support from investors by presenting how AI-driven robots can improve the overall situation of the agriculture. Their small robots can significantly reduce the costs by increasing the efficiency of usable space and by minimizing the waste of chemicals and nutrients. Small Robot Company's robots are using computer vision to identify and analyse every plant in particular, creating the opportunity to feed the plant with exact amount of nutrient and exclude the waste. Among other AI technologies used, Small Robot implemented machine learning technologies, in which the main robot(cloud centre) was taught to analyse data, identify patterns, make classification, and predict future outcomes. Processing the data received from computer vision, main robot can create a "profit map" of the land, considering every crop. So far, the use of AI in precision farming has beneficiated a lot to costs control in agricultural field, however moving to cloud-based AI technologies will rapidly outrun many expectations, and that's what Small Robot Company wants to prove in their innovative approach.

**SWOT**

Strengths

Small Robot Company has a powerful and experienced technical team. They got skilful engineers and programmers, as well as a smart manager, a determined marketer and two experienced farmers. This team works together in building an efficient AI driven robotic service, as well as advertising and making the brand recognised in AgriTech. The fact that they got farmers in their rows means that the developed products are tested and agreed by people who possess practical knowledge in working with crops and soil.

Their revolutionary and award-winning approach have gained a big support not only from farmers but also from IT people such as Matt Jones, principal designer at Google AI, Mark Ellingham, founder of the Rough Guides and others. In this way, Small Robot Company has raised £2.5m in total, including funding from Innovate UK, Indiegogo and the Institute of Engineering and Technology (Crowdcube, 17 Jan 2019). In other words, they became a financial secure company.

Small Robot is a company that won people's hearts by proving that they care about environment and future. Their small robots are kinder to the soil, they protect biodiversity and can improve yields by around one tonne per hectare. For these reasons and many others, the company has won a number of awards and got nearly £1 million funding award from the UK government. Small Robots Company achievements and attitude ensure the trust of their investors and customers, as well as a good public image.

The company is encouraging farmers to try their products by offering a Farming as a Service (FaaS). In this way the customers can take advantage of robotic farming without any risks. In this kind of service, the customers don't purchase the robots, but pay a per-hectare fee. Small Robot provides hardware and software maintenance, as well as regularly equipment updating in case it becomes out of date.

Another strength of Small Robot Company is a strong research based project plan. They got 15 years of research under their belt by Harper Adams University, the world's leading centre for Precis Farming.

Weaknesses

All of the robots are manufactured by Small Robot Company technical team, which consists of only a few members. The production is not automatized yet, that is why, the production of one single robot requires quite a lot of time and money. The costs of building a Tom robot is around $20,000. Because of high production costs, the services Small Robot is providing might seem very expensive for many ordinary farmers. Many old-fashioned farmers are hesitating about using new technology and the high service costs can kill their wish to try something new.

In addition, when it comes to vast territories the service costs are increased significantly, as the small robots are very precis and take every crop into account, that means on big territories farmers do need more robots, which can cost them quite a lot of money.

Opportunities

Small Robot Company can attract more sponsors and investors by lowering their service costs and increase the number of customers. By doing this and providing statistics of efficiency of their robots, they can attract new investors and improve their financial support. Moreover, this action can increase the demand for new products and better public image. With more funds, the company can create new types of robots, as well as upgrading the existing ones. New functionality can be added to the robots, to make the farming process even more efficient. "With £5,000 we will add on extra sona lidar capability to enhance Rachael's obstacle avoidance capabilities; with £10,000 we will develop a soil sampler to check for pollution and water run off; with £20,000 we can build an additional Tom robot, accelerating our capability to build the world's largest living database by a year" – says Small Robot Company (indiegogo.com). Increasing the number of customers can provide the company with insightful feedback, which can help them to improve the service quality. Moreover, good feedback from customers means a good self-advertising opportunity.
Another opportunity would be creating allies, by joining a big platform, Small Robot can get allies that will manufacture specific parts for their robots. This action can somehow automatize the process of robots production and minimize the costs, making the services available for ordinary farmers.

Threats

One of the biggest threats for the company is that farmers, whose main income is agriculture, don't want to risk their farms. Robotics and new technology is something a lot of old-fashioned farmers are afraid of. Farmers don't like tech being impose on them from outside, they are cautious and conservative and like to stick to old, proven technics. The usability of the Small Robot services is aimed to give the ordinary farmers the best user experience, but the lack of IT knowledge makes many farmers refuse to progress.
The main competitor of Small Robot Company is Blue River company that offers AI driven solutions in agri-tech field. Blue River has been found in 2011, much earlier that Small Robot, they have more sponsors and in September 2017 Blue River was acquired by John Deere for $300 million. While remaining an independently-run subsidiary, the partnership gives Blue River access and support from one of the world's leaders in precision agriculture. The fact that such an agriculture giant as John Deere bought a startup company which are using AI to automatically identify and spray herbicide on weeds, meant for Small Robot the appearance of a huge rival in the precision agriculture field.

**Pestle analysis**

Ecological

Small robots are kinder to the soil and to environment than big tractors. The robots are programmed to push each seed into the ground when it's ready, so the soil and biodiversity don't get squished. No tilling is needed, which means a massive reduction of 95% of emissions. Small robots are light, their lightness reduces soil compaction, and improves soil health and root growth. Small robots improve the soil without chemicals, which means an enormous reduction in use of fertilisers, about 90% less. Small robots give the opportunity to treat every plant individually, they can also identify weeds and kill them separately, without covering the whole soil with chemicals. Offering each plant the exact amount of nutrients, eliminates the waste and increases the efficiency of the space. Small robots protects not only the soil, but also the air; it eliminates 90% less $CO_2$ compared to big tractors. Using small robots in farming can improve the state of environment, making the soil healthier and minimize the use of pesticides that damages biodiversity.

Technological

Small Robot Company offers AI driven approach to improve the efficiency of farming and to ameliorate the state of environment. Their small robots can digitally analyse every crop in particular and create a "profit-map", that shows which area of field to use, which to leave fallow, what plant where and when. The robots can give special care to every plant, minimizing the costs for nutrients, pesticides etc. Small Robot Company presents several types of robots, each of them has their individual functionality. The functionality varies from planting, spraying and checking the crops growth to receiving, analysing and giving further instructions. The cloud based data is then analysed and the quality of instructions improved.
Small Robot technical team are constantly working in upgrading the existing robots (adding new functionality, sensors, behaviour), as well as creating new types of robots to automatized a big part, if not the whole farming process.

Social

Small Robot services can have a big impact on farmers social life, first of all, with robots taking on much of the labour work, farmers will only spend 20% of the time on the things that currently generate 80% of revenue. With more free time, farmers can focus on other things, such as, making higher value items – jam and bread, instead of just growing wheat. Implementing the small robots system will decrease the number of available farmer jobs, new farming jobs may appear, suitable for those with good IT knowledge.

Small Robot is attracting more customers by offering a FaaS (Farm as a Service) model, in which the customer doesn't acquire robots, but pays a per-hectare tax. Farmers then can profit of a new life style, as 80% of labour work is done by robots and the maintenance and equipment upgrade is ensured by Small Robot Company. A lot of open-minded land owners that want to take maximum from their lands are switching from old-fashion to precis farming, and here comes Small Robot which offers a no-risk service plan.

Economic

Small Robot is currently focused on UK market, as the agriculture state is poor and there are a lot of farmers that want to switch to precis farming. Small robot is specialized in increasing the efficiency of usable space and minimizing the use of chemicals and nutrients. Agriculture output for UK economy has decreased considerable over last 5 years, same did the self-sufficiency ratio. Moving to precis farming and using AI driven small robots can improve the general agriculture state, increase the agricultural output for UK economy, as well as increasing the self-sufficiency ratio and lower the imports of crops from EU.

Political

UK government are fully aware of the stagnating agricultural situation in the country and they are trying to encourage new agri-tech projects. Small Robot Company has won a £1 million award from UK government, which proves the support politics of the agri-tech development.

Land owners are currently paying a tax that is directly proportional to the size of their land. Using big tractors and old-fashioned technics leads to money being wasted. Small and precis robots eliminate the waste of nutrients and chemicals, protect biodiversity and make the soil healthier and more fertile, increasing the efficiency of the usable space. The solution provided by Small Robot can greatly increase the coefficient of efficiency of the land, that is why more and more farmers are changing to precis farming.

Legal

Being a start up company, Small Robot is working on securing all the copy rights of its business. The Harry robot is now at TLC-4 with three patterns pending.
As Small Robot Company is manufacturing AI driven robots, they consider several sets of ethics and laws when designing and producing their robots. First, Isaac Asimov's "Three Laws of Robotic (Asimov, 1942), agreed by European Parliament in 2016. Second, the set of five ethical "principles for designers, builders and users of robots" in the real world (published in 2011 by the Engineering and Physical Sciences Research Council (EPSRC) and the Arts and Humanities Research Council (AHRC) of Great Britain). In addition, the use of Artificial Intelligence should follow another set of rules, called Satya Nadella's laws. In June 2016, Satya Nadella, a CEO of Microsoft Corporation at the time, sketched five rules for artificial intelligences to be observed by their designers. Small Robot is considering the above set of rules to produce robots that can be used in humans activity (farming).

**Porter's 5 Forces**

Threat of New Entry

Entry barriers are relatively low for agri-tech industry. A new entrant doesn't necessary need a good financial state, as there are a lot of investors ready to financially support start-up projects. Having a well-designed, innovating, and cost efficient solution to an agricultural problem can make the new entrant easily prosper in this industry. The new entrant should consider the copy right patterns of their competitors, and have a new, innovative approach for a successful start.
Even though Small Robot Company is already a well-known brand in this industry, and have more than 15 years of research background, the threat of new entry is causing high pressure on them. Small Robot services are not yet available to everyone, as the full launch is planning in 2022, that is why a new competitor represents potential high risks.

Bargaining Power of Suppliers

The bargaining power of suppliers in the agri-tech industry can be considered low. When looking at Small Robot Company we see that they use iron, plastic, electronic components and Arduino boards, which are made of cheap materials by their nature and can be imported from China at a very low price. All of the components used for robots production are world-wide available, there are thousands of suppliers, so the Small Robot Company has a good control over the prices and quality of their products.

Bargaining Power of Buyers

The bargaining power of buyers for Small Robot Company is very high. Being a start up company that did not launch its full services yet, Small Robot Company's prototype Tom monitoring robot is already developed and in field trials on 20 farms across the UK. The feedback of the current customers is extremely important, as this can determine the success of the future full service launch. Small Robot Company has made a good move by offering a FaaS model, in which customers pay a per-hectare tax for using robots' services. The maintenance and equipment upgrading is delivered by the company. This approach attracts new customers that might hesitate in risking their farms, as this type of model is risk-free, also the FaaS model makes customers stick to Small Robot Company.

Threat of Substitute Products

In terms of Small Robot Company, it can be said that the general need of its customers is minimising the costs of farming and increasing the efficiency of the usable space. This can be achieved by precise farming, and there is a number of other companies offering products in this field. SOYL Precise Farming provides GPS sampling, analysis and mapping to provide customer with detailed soil nutrient information to make informed management decisions. In the case of Small Robot Company, which uses AI-driven robots, this calculations are made by a program, but some experienced farmers might want to see the analysis results of their crops and make their own decision on the further directions. Another competitive product is "The Lettuce Bot" designed and manufactured by Blue River Company, this machine is also using AI, it's main function is applying herbicides only on weeds. It has a great accuracy and precision and can fairly compete with small and precis robots of Small Robot Company. Taken this altogether, the threat of substitutes in precis farming industry can be considered at least medium to high.

Rivalry Among Existing Competitors

Due to the Deloitte Predictions for 2019 regarding the democratization of AI, the number of competitors will increase. Currently, Small Robot Company doesn't have many competitors, as the AI cloud-based approach is underestimated yet. Their biggest competitor is Blue River Technology which offers AI-driven solutions to the overuse of herbicides and pesticides. Blue River is producing "see & spray" machines that automatically detect and spray herbicides on weeds, avoiding cotton plants. Blue River was bought by John Deere, a giant in precis farming field, which offers them great opportunities for further growth and development. The agri-tech industry is developing really fast, the barriers to entry are low, new competitors appear every day. Small Robot Company work on upgrading their technology, as well as on making their services available for small farmers and land owners. They offer high quality services and a FaaS model to get loyal customers. Now, they are focused on launching the full service in 2022. By that time, many other competitors may appear, which will directly affect the prices Small Robot is providing. The service prices may go down in order to keep their customers from switching to another company.

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