TCS Water and WasteWater Utilities Project

Stage 2: Competitor analysis Report

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1 INTRODUCTION

1.1 Background

Maintaining sewage systems is a routine and traditional job that has to be done by maintainers manually. However, with the progress of the times, science and technology are changing with each passing day. Traditional CCTV inspection using sewage pipelines is bound to be renewed and progress. Developing automatic and innovative methods to accelerate the process inspecting inner pipelines is a topic that could be explored in depth.

Fig. 1: a camera showing video recording equipment in pipelines. Retrieved June 29, 2020 from
https://www.allpipetechnologies.com.au/step-by-step-process-of-cctv-pipe-inspection/

1.2 Motivation and Perspective

As we mentioned in the previous paragraph, traditional CCTV inspection on sewage systems has a promising future to be improved. However, knowing how others do and their progress is important for us to gain industry knowledge and technology insights. Therefore, we decided to analyze the whole CCTV inspection on the sewage systems industry and the companies that already work on this topic in depth. We are not only going to analyze the whole industry techniques, process, market and life cycle, but also key competitor analysis and five forces analysis that can make a quick glance at an overview of this industry. We expect that after studying this report, the importance of investing in the CCTV inspection industry and the investability of this market can be well indicated. Next, we would first move on to the industry overview.

2 INDUSTRY OVERVIEW

2.1 Industry Definition

This industry provides governments, private landowners, and industrial customers with sewer inspection services. Companies specialize in various inspection techniques to satisfy a wide range of sewage pipeline inspection needs.

2.2 Industry Inspection Techniques

Inspection products are required to determine the current conditions of the sewer and to assist in the planning of the maintenance strategy. Most sewer pipelines are inspected using following Techniques:

Sewer Inspection Technologies

Camera Based	Digital Scanning, Zoom Camera, Conventional CCTV
Structural and Bedding	Ground Penetrating Radar, Sonar
Defect Specific	Electrical leak detection systems
Hybrid Technology	Sewer Scanner and Evaluation Technology (SSET), RedZone, KARO systems, PIRAT systems

Table 1. Common Sewer pipeline inspection techniques

2.3 CCTV Inspection Process

As the main objective of this project is to take a deep dive into the emerging automated CCTV inspection technology, this section will focus on the process of the traditional CCTV inspection process. Example timeline of current CCTV pipeline inspection:

1. Notice owner of intending works: An approximate execution date should be provided in the Contractor's initial inspection plan.
2. Pre inspection activities: Pre-cleaning and debris removal are necessary prior to the inspection of existing sewer infrastructure.
3. Perform the CCTV inspection: On-site traffic management, flow control and perform the CCTV inspection.
4. Provision of Reports: Provide a detailed inspection report certified by the CCTV inspector. Since this is a manual process, it can take 2-3 weeks.

2.4 In-pipe Inspection Market

According to the In-Pipe Inspection Robots Market report published by Zion Market Research, the global in-pipe inspection market is expected to reach over USD 2,450 million by the end of 2026 growing at a CAGR of more than 16.5% between 2018 and 2026. The major driver for the market's growth is the rising demand from private companies and government agencies for inspecting aging sewer pipelines.

Especially in the U.S., many miles of oil, gas, and sewage pipelines were built before 1960 and are still being used today. That means the majority of U.S. pipelines are 50 years old or older. The aging crucial infrastructure may potentially cause the disruption of the delivery of essential services and result in cascading disasters. To address the problem, the U.S. Department of Homeland Security (DHS) Science and Technology (S&T) Directorate has established a goal to accelerate the delivery and understanding of enhanced technology that addresses the challenges of aging infrastructure according to their report published in 2010.

Camera-based methods such as CCTV have long been considered the most cost-effective techniques in the sewer pipeline inspection industry. To improve the performance of the tool and reduce labor costs in the current process, automating the inspection process has been one of the most important research subjects in recent years. In the following sections, we will take a deep dive into background, products and services, and sales for each key competitor of this changing market.

Fig. 2: Kezdi, M (2019) Crawler robots with cameras, [photograph]. Retrieved June 26, 2020 from Water Finance & Management:
https://waterfm.com/eyes-underground-advances-in-sewer-inspection-cameras-software-help-us-know-whats-below/

3 THE INDUSTRY LIFE CYCLE

3.1 The Position of the Waste Water Utilities Industry

According to Investopedia, an industry usually goes through four phases, which are introduction, growth, maturity and decline.
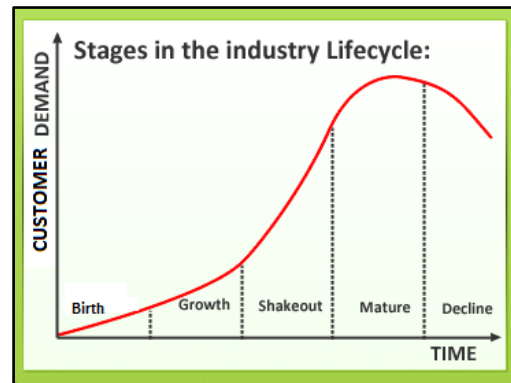

Fig. 3: Hooman Shababi (2013), Industry Life Cycle
https://www.researchgate.net/figure/Stages-in-the-Industry-Life-Cycle_fig3_237810662

The water utilities industry is mostly in the mature phase. In some countries, the government owns the industry, so there are not really many growth opportunities for the revenue. While in the United States, some states have outsourced their water utilities service to private companies, which brings some level of competition, but the overall growth potential is limited, and the companies are mainly focused on cutting costs to gain more profit.

3.2 The Introduction of Disruptive Technologies

Recently, as the power of AI has been discovered in all kinds of industries, the water utilities industry also sees potential in it. Companies that have the expertise in AI are working with water treatment experts to solve some tedious issues. One of them is the detection of failures in sewage pipes.

Traditionally, it takes 1-2 weeks to record the footage in the pipe, and it costs 2-3 more weeks to have field experts manually identify cracks or failures in the pipe. This is not an interesting job, and the position is experiencing a shortage in new employees.

However, with the introduction of AI embedded crack detection, the job of field experts can be greatly reduced, and they do not need to sit in front of the monitor to detect the cracks themselves, they just need to double check the result of AI to avoid mistakes by the system.

3.3 The importance of keeping up with the new trend

Since the introduction of AI is a disruptive technology, it is likely that it will follow the path of a disruptive startup, that is, it will start by taking up the neglected market segment [14]. In this case, AI-embedded companies will target at more efficient detection of pipeline failures, rather than

employing humans to do the work. As a result, if the current companies or contractors do not want to be replaced in this field, it is important that they also research and collaborate with the experts to deploy this new technology.

4 PORTER'S FIVE FORCES ANALYSIS

We introduce the porter's five forces analysis to see this problem from a business perspective, where we see the ML/DL solution of sewer CCTV supervision as a new product, and check the market response of the entry into the market.[1]

4.1 Competitive Rivalry (Risk: Medium)

This looks at the number and strength of your competitors. From the summary above we could clearly see there are not many rivals in the industry right now, however, the rivals come from many different roles in the industry (pipe company/contractor, tech companies, device providers). Since it is a rather new industry, the quality and strength of their product compared to ours are still unknown.
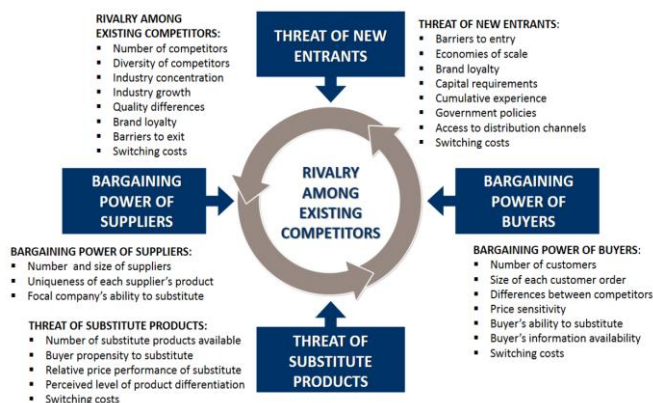

Fig. 4: Porter's Five Forces Model. Retrieved Jun 29th 2020 from https://www.business-to-you.com/porters-five-forces/

4.2 Supplier Power (Risk: Low)

This is determined by how easy it is for your suppliers to increase their prices. As a developer in the market, we don't necessarily have suppliers for our product.

4.3 Buyer Power (Risk: Medium)

We have not many customers, mainly the contractors and pipe companies that are in charge of the inspection and maintenance. These companies are used to manual laborers and are traditional utility industries, it might be hard for the company to embrace a technical change into their operation.

Therefore, the buyer has strong bargaining power as of the price of our software.

4.4 Threat of Substitution (Risk: Medium)

This refers to the likelihood of your customers finding a different way of doing what you do. As we supply a unique software product that automates an important process, people may substitute it by doing the process manually or by outsourcing it. A substitution that is easy and cheap to make can weaken our position and threaten our profitability.

4.5 Threat of New Entry (Risk: Low)

Our position can be affected by people's ability to enter your market. This industry is very highly regulated and the product we are prospecting takes a lot of brainpower and excellent human resources. The other tech companies are not simply copying what we are doing since the algorithm is unseen to the public.

According to Forbes [15], typical sewer solutions require an investment up to $150,000 and years of researching. In a word, it takes too much money and effort to enter the market, and we have much protection of our key technologies. We have strong and durable barriers to entry, and can expect to preserve a favorable position and take fair advantage of it.

5 KEY COMPETITOR ANALYSIS

The current products are highly homogenized, provided as web platforms aiming to streamline the inspection process and make it easier and faster for users to access. Beyond the inspection in the wastewater industry, some companies are planning to utilize their technology to other utility industries like oil, gas and electric cable. International collaboration is another path for them to expand their revenue source. The policy and technology adoption in the process post higher challenges and at the same time great opportunities for them to seize the market.

	Vapar	Subterra AI	Hades AI	Sewer AI
Mission Statement	Delivering the right technology to eliminate repetitive manual tasks in infrastructure management.	Pioneering how cities around the world inspect and manage their subterranean infrastructure.	Machine learning to detect defects in sewer inspection videos – faster, more objective and less error-prone.	Accelerating industry workflow, Improving quality, providing insights, Reducing cost.
Physical Location	Sydney Australia	OH USA	Zurich	CA USA
Founded Date	2018	2018	2018	2019
For-profit Non-profit	For-profit	For-profit	For-profit	For-profit
Number of Employee	1-10	1-10	11-50	1-10
Funding	25k	-	-	Seed funding from Builders VC
Product and Service	Vapar Solution Platform Pipe CCTV condition assessment + ML defect Identification + Map embed Visualization	1.Sewerlytics™:A cloud based platform to upload, review and share inspection data via the web 2.Starter Package:A rapid check for critical or unknown large diameter sewer pipe segments using the SewerScout™ and an onsite Subterra AI expert	Software service (Machine learning to detect defects inspection videos)	1.AutoCode™ An AI tool to automatically label defects in sewer pipe inspection videos using existing condition assessment standards for defects and features. 2.Inspection management Platform: S web based tool that can stream inspection videos, view reports, access data analytics and predictive models for risk assessment.
Competitive Advantage	Filter results by overall condition scores to identify pipes needing the most attention	The product is 30 times faster and at half the cost of current technologies.	Fast: Speed up time from recording to results by 3x. Secure: Leading cloud provider. Secure access. Encrypted data transfer. Automatic backups.	Able to design their algorithm to analyze non-HD videos. This platform enables users to directly see the defect Bounding box without rewinding the entire video.

Table 2. Comparison of key competitors

6 CONCLUSION

CCTV inspection of sewage systems is a critical subject that should be resolved. According to a Forbes article regarding this new technology field, sewers have been systematically underfunded. In the past, it was not a big issue since sewage systems have been designed with a long service life. However, at this period, a big part of them are reaching their end of life and are falling apart (Boller, 2020). Therefore, governments need to spend billions of dollars to maintain and renew the system. Where to spend the money most efficiently and effectively would have to take precedence over other fields. After indicating the benefits of investing in the CCTV inspection on sewage industry and the competitor analysis about the trending technology, we hope that the promising and urgency of investing into this industry are shown obviously.

TEAMWORK DISTRIBUTION TABLE

Name	Responsibilities
Maggie	Introduction, Conclusion
Linda	Industry Overview, Report Organizer
Hanyun	The Industry Life Cycle, Report Organizer
Haijing	Porter's Five forces analysis
Joy	Key Competitor analysis

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