**ASSIGNMENT COVER SHEET**

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| **Student’s name** | Joshua | Morton |
| **Module name** | Technology in the Organisational Context | |
| **Title of assignment** | Propel Tech’s Strategy for Market Expansion | |
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All work must be submitted by the due date. If an extension of time to submit work is required, a [CMDA Mitigating Circumstances Extension Form](https://www.roehampton.ac.uk/4aa7e3/globalassets/documents/quality-and-standards/mitigating-circumstances-policy.pdf) must be submitted.



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# Propel Tech’s Strategy for Market Expansion

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# The Impact of Information Systems

## Overview

Propel Tech operates as a consultancy providing Software Development as a Service (SDaaS). The core service revolves around providing immediate access to a dedicated in-house team composed of software engineers, testers, and project managers. By using the SDaaS model, clients can initiate software development projects without undergoing the typical recruitment process (Burak, 2023). The scalability of Propel’s service allows for project staffing adjustments according to individual client needs.

## Propel Corporate Website

To effectively market their brand, showcase their rich portfolio of client case studies, and increase visibility in the crowded tech consultancy market, Propel needed a robust, flexible, and SEO-friendly platform for their public-facing website. The previous system was rigid, built in WordPress, limiting design options, and making content management cumbersome (Melvær, 2023).

To address these challenges, they turned to Umbraco CMS. Built on Microsoft’s .Net Core Framework, Umbraco gives complete control over the architecture and templating of websites. Allowing them to leverage their internal graphic designers to implement bespoke designs that authentically reflect their unique brand and services, without being confined by preset themes. (Umbraco, N.d.)

Umbraco features a rich content management user interface and an extensive built-in media library that streamlined the management and launch of Propel’s multi-channel marketing campaigns. They can now take advantage of content scheduling to publish insights in advance and automate the process of rolling out advertising across multiple social media platforms. This has made their marketing efforts significantly more efficient.

Plus, Microsoft’s .NET’s templating engine provides excellent solutions for search engine optimization, supporting dynamic metadata tags, custom URLs, and advanced accessibility controls, (Price, 2021). These boons have improved their website’s visibility in search engine results amongst competitors.

Propel also leveraged Cloudflare’s content delivery network (CDN) within Umbraco to cache static assets such as images, style sheets and scripts. This resulted in exceptional page load times, even on throttled mobile devices, bolstering their Google page speed ranking whilst also delivering improved user experience (Osten, 2022).

## Information Systems Strategy Triangle

A diagram of a business strategy

Description automatically generated with medium confidence

Figure Information System Strategy Triangle (Chen 2012)

The Information Systems Strategy Triangle posits that a business's success hinges on the harmony between its Business Strategy, Organizational Strategy, and Information Strategy. In other words, these strategies are interdependent, decisions made in one domain must be aligned with and supported by decisions in the other two (Shanardis, 2018).

Consider a scenario where the CEO of a manufacturing firm decides to expand their business operations internationally after having only shipped domestically. This strategic business decision would trigger necessary adjustments in both organizational and information strategies.

For the Organizational Strategy, the company would need to adapt their product offerings to meet the legal and regulatory standards of the targeted international markets. Additionally, the decision could lead to discussions on whether to open new manufacturing facilities overseas or continue with domestic production and deal with international shipping logistics. They would need to broaden their logistics framework to account for air or sea freight, which would have its own set of implications and requirements. (Sarah Gage, 2023)

From an Information Strategy perspective, their e-commerce platform would need significant upgrades to accommodate a global customer base. This could mean supporting multiple languages, accepting different currencies, and ensuring compliance with international data protection and privacy regulations. Such an endeavor could potentially translate into a substantial software development project, demanding adequate resources and careful planning.

This international expansion decision encapsulates how business strategy drives changes in both organizational and information strategies. The alignment of all these strategies is crucial for the successful execution of the new business direction.

In line with Propel Tech's Business Strategy of enhancing brand presence and market visibility, the switch to Umbraco - an informed Information Strategy - provides an SEO-friendly platform to boost online prominence.

Regarding Organizational Strategy, Umbraco's flexibility allows Propel Tech to fully leverage its internal design, development, and marketing skills, fostering operational efficiency. These goals ultimately lead to Propel’s decision to use a CMS as seen in Figure 1 below.

A diagram of a flowchart

Description automatically generated with low confidence

Figure : Do You Need a CMS For Your Site? (Enge et al., 2015, p.423)

Finally, adopting Umbraco signifies a strategic Information System move, utilizing Microsoft's .Net Core Framework, Cloudflare’s CDN, and SEO capabilities, aligning with business and organizational objectives and demonstrating commitment to advanced IT solutions.

## Competitive Advantage

Potential clients, regardless of industry, are often cautious when choosing a business partner to provide expensive services (Brandstettar et al, 2006). A vibrant, high-speed, and content-rich public-facing website is a key factor in piquing the interest and securing the trust of prospective partners early on. Analytical data substantiates Propel’s strategy's effectiveness, as it demonstrates a surge in their brand's visibility. Furthermore, they’ve observed a consistent upward trend in the ratio of website clicks leading to client inquiries.

Presenting a portfolio of past projects and case studies that exhibit successful client relationships across a diverse range of industries is a great way to gain a competitive advantage in a saturated industry.

Employing a contemporary technology stack enabled Propel to incorporate the latest technologies swiftly and economically into their website, a process that could take legacy CMS platforms years or even decades to accomplish.

Following the initial development phase, Propel’s engineering and test team can fully devote their time to client projects. This leaves the task of content management to the marketing team, establishing it as a cost-effective solution for the long run. This further reduces the necessity for development hours allocated to modifications, allowing more efficient allocation of resources to client projects.

Umbraco is an incredibly potent CMS system; however, it is under-utilized due to its complexity for organizations without their own dedicated software developers. Possessing this hands-on experience equips Propel with valuable evidence required to offer Umbraco development as a service. This has given Propel an advantage of being able to access a niche in the market – they recently won a large greenfield development contract through the discovery of their adoption of Umbraco.

# Managing Information Systems

## Client Intellectual Property & Data Privacy

Typically, as third-party consultants, Propel face a significant challenge related to the management of Information Systems in the context of Intellectual Property (IP) ownership by clients. This challenge is multi-faceted and involves legal, operational, and technical aspects. Encouraging clients to maintain full ownership of their IP was a business strategy decision Propel made to be a more appealing choice to potential clients. To facilitate this, both organisational and information strategies must be adapted to the number of challenges this decision presents.

Before the commencement of any support or development planning, legal agreements must be established to ensure the clients’ IP rights are upheld. This process can be time-consuming and complex due to the necessity to define precise terms and conditions regarding the management and access to the client-owned IP (Hubbard, 2014).

Operationally, additional infrastructure must be planned and implemented to establish virtual private networks (VPNS) and virtual machines (VMS) to host development environments. This is necessary to enable Propel’s developers to work on client products without compromising their security or infringing on IP rights, as having local copies of these products on their work machines would violate both aspects.

With respect to the Data Protection Act (Uk Government, 2018) and to safeguard client information, all processes and documentation related to the client must be covered by an internal non-disclosure agreement for circumstances that are not inherently covered by General Data Protection Regulation (GDPR).

There are several consequences of not following these procedures such as: legal fines and loss of up to 4% (Northern Island Business Info, n.d) of revenue for serious GDPR infringements, legal disputes over mishandling of intellectual property and hindered growth in both the short-term from losing clients as well as long-term from loss of reputation.

## Maintaining a versatile & evolving skillset within the Information Systems team.

In the realm of Software Development as a Service, the ever-evolving nature of technology necessitates a diverse skillset within Propel’s organization. This aligns with their business objectives of meeting varied and specific client needs and staying competitive in the industry. The Information Systems (IS) strategy challenges that emerge in this context include:

Continuous Talent Acquisition: Propel’s success hinges on their ability to consistently provide superior services compared to their competitors’ and clients' in-house teams. This necessitates constant investment in talent acquisition, particularly in hiring new graduates and apprentices who are abreast with emerging technologies. These younger developers are often more adaptable and eager to learn, making them an asset (Kenton, 2022). If Propel fail in this acquisition, they risk not being able to meet the technological demands of their clients, which could harm competitiveness. To address this, Propel launched graduate and apprentice schemes aimed at attracting and nurturing new talent.

Balanced Recruitment: The challenge here is to strike a balance between recruiting generalists, who offer adaptability across varied technologies and clients, and specialists who bring in-depth knowledge in specific fields. Without this balance, Propel are at risk of either lacking specialized skills or being unable to adapt quickly to diverse client needs. Propel address this by conducting targeted recruitment, hiring generalists for their broad knowledge and specialists when business and organizational decisions justify the need, such as securing a contract that requires specific technical expertise (McCuller, 2012).

Continuous Learning and Development: Given the rapid technological changes, a significant challenge is to ensure Propel’s development skills remain updated. If not managed effectively, this could lead to outdated skills, reducing their ability to meet client needs and stay competitive. To address this, they allocate significant resources to learning and development. This not only keeps their team's skills updated but also facilitates their professional growth, thus contributing to employee retention.

## Knowledge Management System

The backbone of any software consulting business is it’s Knowledge Management System (KMS). Keeping an organized and consolidated repository of information of client processes, quotes & invoices, contact information, and application-level documentation as well as keeping a public record of client communications and meetings transcripts (Maeir, p.21, 2007).

This is a business-critical system, as inefficient knowledge management can lead to missed deadlines, duplicated effort, miscommunication, increased costs, and decreased client satisfaction (Krishnan, 2022). Therefore, maintaining an effective KMS is both a challenge and a necessity.

A well-maintained KMS can dramatically speed up development and support projects by providing ease of access to necessary information, allowing rapid onboarding for new developers. This eliminates the time wasted searching for information and ensures that everyone is working from the same knowledge base, leading to increased efficiency and reduced errors. It can often mean the difference between keeping or losing a support-oriented client – as without documentation, high priority incident rectifications may be too slow or too expensive. Moreover, it allows for easy identification of potential improvements to operational efficiency.

To address the challenge, Propel invested in Atlassian’s Jira, Confluence & BitBucket products, a robust solution to Knowledge & Project Management that can be integrated directly with their software deployment and sprint planning pipelines (Packt, n.d.). This offers version control for documentation, allowing them to more accurately track if information is out of date and requires modernization as well as ensuring data persistence.

In addition to a heavy investment in a proven KMS, a business strategy Propel employed is factoring documentation into their invoicing and estimate process, which ensures the service provided improves over time as they gain more experience and familiarity with the nature of issues their clients face.

# Emergent Technologies to Support operations.

## Artificial Intelligence (AI) & Machine Learning (ML)

It would be disingenuous to have a conversation about emergent technologies in 2023 without addressing the technological advancements in AI and the progress made by ML engineers.

AI is the broader concept of machines being able to perform tasks that humans consider “Intelligent”, ML is the process of training AI products on extremely large datasets, enabling them to autonomously improve and adapt their performance over time (Google, n.d.).

GitHub CoPilot, OpenAI’s ChatGPT and Adobe’s ‘Generative Fill’ are powerful tools, powered by AI, that can make Propel’s developers significantly more efficient at implementing client solutions (Zhao, 2022).

CoPilot is a code completion tool that works directly in integrated development environments, it knows the context of the active solution, allowing it to provide highly relevant suggestions.

Similarly, ChatGPT can provide solutions to development problems when given proper context in prompts. However, the advantages extend far beyond just code solutions; it can proofread emails and provide feedback on the tone and clarity of the message, offer multiple points of view when dealing with complicated logic and quickly complete repetitious tasks.

Adobe’s ‘Generative Fill’ can take any image or photograph and either modify the existing content, or predictively expand your image (Lee, 2023). This can be used for content for Propel’s marketing approach, as well as creating website designs or providing multiple options with significantly reduced effort from their graphic designers.

These tools are extremely helpful, but they are no replacement for humans as they lack the ability to understand business requirements and more broadly, the entire business domain and user context that requires a more abstract human mind to interface with. However, as Propel’s main product is time, the use of these tools will make them faster and more efficient at providing their services, reducing overall costs to clients, and making Propel more desirable amongst competitors (Bender, 2023).

## Cloud & Edge Computing

Traditionally, companies hosted websites on their in-house servers, scaling hardware as user bases expanded. This expensive approach required maintaining a technical team for server management and cybersecurity experts to guard against potential vulnerabilities exploited by malicious actors.

Taking advantage of cloud hosting providers such as Amazon Web Services or Microsoft Azure can entirely remove the need for in-house staff to build hosting platforms as businesses scale.

These are several financial and operational problems associated with in-house, physical hosting, such as:

* Physical servers result in poor performance if the user is not situated in your geographical region.
* If you encounter any server outages or mandatory maintenance, your business can suffer a loss of revenue from downtime.
* Businesses must size their servers to handle peak demand, leading to manual scaling or consistent high costs to accommodate traffic spikes.

(Eclipse Suite, 2022)

Dedicated cloud engineers are extremely expensive, as experienced engineers are sought after. As an agency, investing in the acquisition of cloud engineers and training the existing development team to qualify for cloud certifications is crucial to winning contracts with larger companies, therefore supporting strategic growth.

Possessing these abilities internally will enable Propel to utilize cloud technologies to deliver client projects more efficiently and adaptively, aligning with their goal of growth and superior client service.

Netflix is an excellent example of a company whose business model couldn’t succeed without cloud hosting. They use cloud computing to handle huge traffic surges and deliver content globally, supporting their vision of being the world’s largest streaming service (Hunt, 2016).

## Cyber Security & Internet of Things Devices

Oracle (n.d.) defines the Internet of Things (IoT) as a network of physical “things”, they are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. Cybersecurity in IoT devices involves protecting these devices and the networks they're connected to from potential cyber threats. As the number of connected devices increases, so does the risk of cyber-attacks. This can include encryption of data, secure device authentication, firmware updates, and tamper detection systems.

Consider the infamous Mirai botnet attack in 2016 (Cloudflare, 2017), which turned networked devices like routers and IP cameras into bots to launch devastating distributed denial of service (DDoS) attacks. This event highlighted the importance of cybersecurity for IoT. In response, companies worldwide are now investing more in IoT security. For example, Amazon's AWS IoT offers features like encryption and automated security assessments, demonstrating a proactive approach to IoT security (Amazon, N.d.). By having expertise in IoT cybersecurity, Propel could help their clients to avoid such breaches and build trust in the software products they develop.

Propel could invest resources in understanding and implementing IoT cybersecurity measures to provide a competitive edge. It could widen their service portfolio and allow them to cater to clients in the IoT industry. It can also set the stage for Propel to adapt and grow alongside the expanding IoT industry, aligning with their strategic vision of being at the forefront of the software consultancy field.

# Appendix A:

## Figures:

Figure 1:

An interpretation of the Information System Triangle Model and foundational decisions that combine strategies.

Adapted from a presentation given by. Jason C. H. Chen, Ph.D. Professor of MIS School of Business Administration, Gonzaga University. Project and Information Systems: IS Strategy Triangle Model. Slide 25.

Figure 2:

The decision-making process for justifying adoption of a Content Management System.

Adapted From “The Art of SEO”, by Eric Ange, Stephan Spencer, and Jessie Stricchiola. 28th August 2015. The Art of SEO 3e: Mastering Search Engine Optimization. 3rd Edition. Page 423.

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