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**Strategic Business Information Technology**

**Strategic Analysis of Emerging Technology for Competitive Advantage**

**CA2**

**Dublin**

**2025**

**CCT College Dublin**

**Assessment Cover Page**

*To be provided separately as a Word doc for students to include with every submission.*

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| **Module Title:** | Strategic Business Information Technology |
| **Assessment Title:** | Strategic Analysis of Emerging Technology for Competitive Advantage - CA2 |
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Below you can access the progress of this assignment.

<https://github.com/CharlesMalonRocha/SBIT---CA-2>

**Declaration**

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| By submitting this assessment, I confirm that I have read the CCT policy on Academic Misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source. I declare it to be my own work and that all material from third parties has been appropriately referenced. I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution. |

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Technologies chosen

Internet of Things

Edge Computing

Specific Artificial Intelligence Application

Introduction

In the ever-evolving digital landscape, emerging technologies are transforming how businesses operate and compete. One such transformative technology is Edge Computing. As data generation grows exponentially due to the rise of the Internet of Things (IoT) devices, there is a growing need for faster, more efficient data processing solutions. This report explores Edge Computing, focusing on its adoption in the retail sector and how it provides a competitive advantage.

What is Edge Computing?

Edge Computing is a distributed computing paradigm that brings computation and data storage closer to the data source. Unlike traditional cloud computing, where data is transmitted to centralized servers for processing, Edge Computing performs this processing locally on edge devices. This results in reduced latency, improved speed, enhanced security, and optimized bandwidth usage.

Why Edge Computing is an Emerging Technology

Edge Computing is considered an emerging technology due to its increasing relevance across industries, driven by the proliferation of IoT devices, advancements in AI, and the rollout of 5G networks. According to Gartner, by 2025, 75% of data will be processed at the edge. Its ability to process real-time data efficiently is critical for modern applications that require instant decision-making.

Use of Edge Computing in the Retail Sector

Retail giants such as Amazon and Walmart have adopted Edge Computing to streamline operations and enhance customer experiences. In smart stores like Amazon Go, edge devices process data from cameras and sensors to enable cashier-less checkouts. Walmart uses edge computing for real-time inventory management, energy optimization, and customer behavior analytics.

Benefits include:

* Faster transaction processing.
* Personalized customer experiences.
* Reduced operational costs.
* Improved supply chain efficiency.

Competitive Advantage Analysis

Porter's Value Chain Analysis:

**Inbound Logistics:** Real-time inventory tracking using edge sensors reduces stockouts and overstocking.

**Operations:** Automation through edge computing reduces human errors and speeds up processes.

**Marketing & Sales:** Personalized marketing based on in-store customer behavior captured via edge devices.

**Service:** Faster issue resolution and proactive support using predictive maintenance at edge locations.

Edge Computing enables retailers to differentiate by offering seamless experiences, reducing wait times, and maintaining accurate stock levels, leading to increased customer satisfaction and loyalty.

Challenges and Limitations

Despite its advantages, Edge Computing poses challenges:

**Security:** Localized data processing increases the attack surface.

**Infrastructure Cost:** Requires investment in edge devices and their maintenance.

**Data Management:** Handling distributed data securely and efficiently is complex.

Future Outlook

Edge Computing is set to grow with the advancement of 5G, AI at the edge, and edge-cloud synergy. Future applications in augmented reality shopping, real-time customer analytics, and robotic automation will further enhance retail operations and customer engagement.

Conclusion

Edge Computing is revolutionizing the retail sector by enabling faster, smarter, and more secure operations. As businesses strive for digital transformation, leveraging edge technology provides a sustainable competitive advantage through enhanced efficiency, improved customer experiences, and innovation-driven growth.

References

Alwakeel, A.M. (2025). Enhancing IoT performance in wireless and mobile networks through named data networking (NDN) and edge computing integration. Computer Networks, 264, p.111267. doi:https://doi.org/10.1016/j.comnet.2025.111267.

(Alwakeel, 2025)‌

Gao, Z. and Yan, W. (2025). The real-time data processing framework for blockchain and edge computing. Alexandria Engineering Journal, 120, pp.50–61. doi:https://doi.org/10.1016/j.aej.2025.01.092.

‌

(Gao and Yan, 2025)

Shi, W., Cao, J., Zhang, Q., Li, Y. and Xu, L. (2019). Edge Computing: Vision and Challenges. IEEE Internet of Things Journal, 3(5), pp.637–646. doi:https://doi.org/10.1109/jiot.2016.2579198.

(Shi et al., 2019)

Varghese, B., Wang, N., Barbhuiya, S., Kilpatrick, P. and Nikolopoulos, D.S. (2016). Challenges and Opportunities in Edge Computing. *2016 IEEE International Conference on Smart Cloud (SmartCloud)*. [online] doi:https://doi.org/10.1109/smartcloud.2016.18.

(Varghese et al., 2016)

Amazon (2023). *Amazon Go.* [online] Amazon.com. Available at: https://www.amazon.com/b?ie=UTF8&node=16008589011.

 (Amazon, 2023)

Walmartcanada.ca. (2025). *Walmart Canada announces landmark $6.5 billion investment in its store and supply chain footprint, announcing dozens of new stores to be built across Canada over the next five years*. [online] Available at: https://www.walmartcanada.ca/news/2025/01/30/walmart-canada-announces-landmark--6-5-billion-investment-in-its.

(Walmartcanada.ca, 2025)‌

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