

Smart Campus Strategy Advisory Report:



Table of Contents

Table of Contents	2
1. Introduction	3
1.1 Company Overview	3
1.2 Company Strategy	3
1.3 Operating Landscape	4
2. Smart Campus	4
2.1 What is a smart campus?	4
2.2 How to assess the complexities of a Smart Campus?	5
3. Challenges	6
3.1 Physical Security & CyberSecurity	7
3.2 Campus Optimization: Hybrid Learning, Student Experiences & Sustainability	7
4. Proposed Solutions	8
4.1 Planning	8
4.1.1 Physical Security & CyberSecurity	8
4.1.2 Campus Optimization: Hybrid Learning, Student Experiences & Sustainability	10
4.2 Implementation	12
4.2.1 Physical Security & CyberSecurity	12
4.2.2 Campus Optimization, Hybrid Learning & Sustainability	13
5. Conclusion	14
6. References	16

1. Introduction

1.1 Company Overview

Cisco is a company based in San Francisco, California that was founded in 1984 by Leonard Bosack and Sandra Lerner. Cisco initially focused on selling multiprotocol routers. Over time, they expanded their business to include software development and related equipment. By 1997, the company was producing nearly 80% of the large-scale routers that facilitated the Internet. Despite their diverse product range, they maintained a leading position in almost all the markets they entered. Nowadays, Cisco offers an industry-leading portfolio of technology innovations. Cisco's mission is to help securely connect industries and communities (Cisco, 2024).

Cisco defines its purpose as powering an inclusive future for all by helping our customers reimagine their applications, power hybrid work, secure their enterprise, transform their infrastructure, and meet their sustainability goals. Currently, Cisco is considered one of the leading and most important companies in the technology and telecommunications industry. The company's presence is in over 100 countries on all continents with clients that range from telecommunications to education industries with revenue over a few billion dollars annually (Cisco, 2024).

1.2 Company Strategy

In the 90s the company grew quickly through the adoption of an "acquisition strategy", in just seven years Cisco acquired 70 companies. This new strategy brought benefits and challenges that the company needed to surpass. Despite this, the aggressive acquisition strategy adopted by Cisco proved to be satisfactory, since they managed to synthesize it into five fundamental pillars that allowed them to successfully incorporate these new companies as their own: proximity, vision, long-term strategy, success with customers in the short term and cultural fit of people.

The strategy mentioned above combined with actively listening to customers and not marrying any technology was what allowed Cisco to become the telecommunications and technology giant we know today. Presently, Cisco still maintains a M&A growth strategy to bring new technologies and business models to the company. It can be implemented by any organization to align with its purpose and strategy (Serafeim, 2023). Through the incorporation of these environmental factors, the company manages to attract consumers, investors, and stakeholders who prioritize companies that have a positive impact on society. Likewise, through this practice, the company is able to manage risks, address inequities, and demonstrate transparent progress toward achieving its purpose.

1.3 Operating Landscape

When discussing the operating landscape, it refers to the context in which the company operates, this is made up of the internal and external conditions that influence the company's decision-making and strategy. Understanding these elements is a necessity so that Cisco can successfully endure over time and thrive (Hunt & Hunt, 2024). In today's world, markets are constantly changing, reshaping the interactions and roles of those involved. In particular, the market in which Cisco operates (Information and Communication Technology (ICT)) is greatly influenced by new trends and emerging technologies that continuously change the landscape. In context, a dynamic market is seen, which poses risks for the company, associated with fluctuations in demand, competition, market adoption of new technologies, and lead times, among others (Cisco, 2023).

2. Smart Campus

2.1 What is a smart campus?

University Campuses can be described as complex systems composed of various elements that influence each other (people, infrastructure, etc.). The concept of a "Smart Campus" refers to the set of practices that aim towards the improvement and solution of economic, social, and environmental problems within the university context, with an emphasis on the social well-being of those who make up this space. Smart Campuses enable a physical and technological infrastructure that allows systems and devices to be controlled automatically according to context. (Makdissi, Boutaud & Dalmolin, 2016 as cited by Galeano-Becerra et al., 2018) The success of "Smart Campuses" relies on its capacity to connect communities, this document uses a Smart Campus model that breaks it down into five fundamental pillars to guarantee its correct development and implementation (Galeano-Becerra et al., 2018).

Firstly, "People and Habitat" pillar that describes the quality of basic services, for the development of "life" on campus as well as their economic affordability from a research and management perspective. Second, "Economy" describes the allocation of economic resources and plans provided for their utilization, bringing benefits to the community (partnerships, innovation, financing, and so on.). Third, "Energy" focuses on the use of energy in a sustainable manner, in its production, distribution, and consumption. Fourth, "Environment" refers to environmental impact, waste management, water use, and green areas, among other significant environmental considerations. Finally, the last dimension, "Mobility" evaluates the logistics and infrastructure to move around the campus, as well as to move to and from the campus.

2.2 How to assess the complexities of a Smart Campus?

Smart campuses involve multiple disciplines, including education, technology, urban planning, and governance. Integrating these diverse aspects requires collaboration among educators, administrators, IT professionals, and city planners (Dong et. al, 2020).

Technological integration is a major aspect of smart campus development. Implementing smart technologies (such as IoT devices, sensors, and data analytics) across campus buildings, classrooms, and outdoor spaces is a complex matter. Ensuring seamless connectivity, data security, and interoperability should be prioritized for an effective smart campus. Furthermore, non-target technologies that are going out of fashion should be avoided, as they may become obsolete. That is why selecting the right technologies is also crucial for the long-term continuity of implementations (Dong et. al, 2020).

Data privacy and security have become a concern with multiple interconnected networks and data sharing is present (Dong et. al, 2020). Collecting and analyzing data from various sources (e.g., student attendance, energy usage, and environmental conditions) raises privacy concerns. Safeguarding sensitive information while enabling data-driven decision-making is a challenge.

Personalization of education is an important complexity of the smart campus, as it is believed to contribute positively to the learning experience, however, it may raise concerns in terms of standardization, equality, and fairness. Smart campuses aim to personalize learning experiences for individual students. The balance between customization of services and ensuring privacy is a complex task.

Energy efficiency is an important pillar of the smart campus. Smart campuses strive for energy efficiency, reduced carbon footprint, and sustainable practices. Integrating renewable energy sources, optimizing building designs, and managing resources efficiently are challenges (Dong et. al, 2020).

Finally, effective stakeholder management is a key component. User adoption and training are factors to consider in part because faculty, staff, and students need ample time to adapt to new technologies and workflows. Providing training and support to ensure the effective utilization of smart tools is crucial. Involving students, faculty, administrators, and local communities in decision-making and planning is essential. Ensuring alignment with stakeholders' needs and expectations can be intricate (Dong et. al, 2020). Stakeholders can be roughly grouped by: University Staff, University Students, and Contracting Parties. Table 1 below presents an oversight. The interests of various stakeholders should be considered when implementing any change.

University Staff		University Students			Contracting Parties
Teaching Staff	Teaching Assistants	Applicants			• Supermarkets • Cafes & Restaurants • Sports Center • Security • Constructors
	Lecturers				
	Professors	Students <i>(Bachelor, Master, PhD)</i>	International Programs	Local Programs	
University Management	Program Managers				
Facility Management	Security IT				

Table 1: Overview of stakeholders

3. Challenges

Educational areas that Cisco is actively involved in improving that are in the scope of smart campus include ‘Student experiences’, ‘Faculty and staff experiences’, ‘Intelligent campus’, ‘Cybersecurity’, and ‘Research Infrastructure’ (Cisco, 2024). We identified a couple of underlying challenges that can be further addressed by Cisco’s smart campus strategy. Our focus is on challenges that concern multiple stakeholders in the educational environment. Our recommendations can be categorized under security (physical and cybersecurity) and campus optimization (hybrid learning, student experiences, and sustainability).

3.1 Physical Security & CyberSecurity

Security Challenge 1: Lack of Identity Authorization on Campus Buildings

Firstly, many buildings at Erasmus University, as well as other universities, are accessible by anyone and require no authentication before entry, presenting significant security risks. This proposes the threat of unauthorized entities entering the buildings for theft, damage to the facility, or simply making

use of the facility without being enrolled in any educational program. For example, every year there are incidents of missing personal belongings on campus. Another example is the recent protests that resulted in physical violence around universities in the Netherlands. (NL Times, 2024) Cisco could implement smart campus security measures to prevent such action by unauthorized entities.

Security Challenge 2: Ever-Evolving Cybersecurity Threats

In addition to physical security, cybersecurity has been a growing concern since the rapid growth of internet usage, and university campuses are not exempt from the threat of cyber attacks. For example, a considerably recent ransomware attack on Maastricht University successfully hijacked the entire database of the university, resulting in the university having to pay as much as \$250k to the attackers to settle (NL Times, 2020). Tools and technologies that enable the execution of cyber attacks are ever-evolving and adapting to the developments in the field; therefore, they should be proactively addressed with cybersecurity measures.

3.2 Campus Optimization: Hybrid Learning, Student Experiences & Sustainability

Optimizing a smart campus encompasses several facets, particularly in how space and resources should be managed.

Campus Optimization Challenge 1: Deficient “Reserve Study Spots” System.

Firstly, it is not possible to reserve study spaces in some institutions. At Erasmus University Rotterdam, it is required to reserve your spot in the library before your visit and some students without a reservation are still able to make use of empty spaces near the entrance. In addition, the EUR StudyRooms app displays the availability of classrooms, with information on time slots, in real-time. This is useful in theory, however when many students rush at once to the seemingly ‘free’ study spaces, the spaces are quickly occupied, but the app is not aware of this information, and keeps displaying the spaces as free, causing inefficiency and overcrowding, and a bad user experience.

Campus Optimization Challenge 2: Reinforce Hybrid-Learning

In terms of hybrid learning, the pandemic has accelerated the adoption of hybrid models where students alternate between physical attendance and online participation, and, even after the pandemic, the adoption of this model continues to increase, supported by people's new lifestyle. This model demands a prepared IT infrastructure capable of supporting live streaming, virtual classrooms, and high-volume data transfers without interruption. While most universities strive to offer high-quality hybrid learning experiences, they often encounter challenges with connectivity and accessibility. These issues primarily

affect users who struggle with inconsistent internet connections or lack of familiarity with digital learning platforms. Cisco could enhance this aspect by offering solutions related to high-quality connectivity and accessibility for all users, regardless of their physical location.

Campus Optimization Challenge 3: Ensure Sustainability

Moreover, sustainability is becoming increasingly important on campuses around the world. Universities are exploring ways to reduce their carbon footprint through better energy management and smarter resource allocation (Kiehle, 2023). Universities must implement smarter environmental practices aligning the university operations with global sustainability goals, and Cisco's technology could manage to integrate energy-efficient practices and systems that optimize heating, ventilation, and lighting based on actual space usage and environmental factors.

4. Proposed Solutions

4.1 Planning

The planning phase for implementing smart campus strategies is essential for addressing the actual challenges faced by educational institutions. Cisco's solutions options can enhance both physical and cyber security, as well as improve campus operations in sustainability and hybrid learning. Some of the proposed solutions are as follows.

4.1.1 Physical Security & CyberSecurity

The planning phase for enhancing physical security and cybersecurity on campuses begins with an assessment of existing security operations and potential vulnerabilities. This assessment should include both physical assets like buildings and public spaces, as well as digital infrastructure such as network systems and databases. This type of security audit involves deep reviews of campus facilities to assess existing security measures, identify vulnerabilities, and evaluate potential threats. This process includes checking the ease of access to buildings and the effectiveness of current surveillance and access control systems.

Challenge 1: Lack of Identity Authorization on Campus Buildings

The University records management system that keeps track of student's information can be utilized for the development of an authentication step at every gate to the campus buildings. A traditional approach would be to produce identity cards for enrolled students with an RFID tag, in combination with the authenticator technology attached to an electric door. A more modern approach would utilize smartphones that the great majority of the students & faculty possess. The university/Cisco can create a

unique QR code that uses verification similar to DUO mobile (mobile application for two-factor authentication) or use smartphone Bluetooth capabilities for keyless entry. An active camera device should control the electric doors, authenticating the identities of students in connection with the mobile app, which will be linked to the main records database in a OneIdentity computer system. A promising framework to help tackle this issue is the ISE Framework by Cisco. The Cisco Identity Services Engine (ISE) is a comprehensive Identity & Access Management system created by Cisco. It contains an extensive pre-deployment checklist (Cisco Community, 2020). This checklist serves as a roadmap, encompassing various elements such as pre-existing technologies like PKI or Certificate Authority (CA), business and organizational considerations, security policies, capacity planning, and NAD's endpoints, among others.

Although its scope is mainly towards network and data security, the I&AM framework and the pre-deployment checklist that the ISE framework includes can also be adjusted and applied in the implementation of this physical security issue.

Challenge 2: Ever-Evolving Cybersecurity Threats

The cybersecurity evaluation focuses on verifying the existing IT and network infrastructure to uncover vulnerabilities that could be attacked by cyber threats. This review also includes monitoring previous security breaches to better understand the tactics used by attackers and the solutions for them. After security audits and evaluations are made, the next step is to review the overall effectiveness of the already implemented security measures, determine the specific areas where improvements are necessary, and identify the most suitable Cisco technologies to implement. This approach will improve campus security and optimize the use of Cisco's solution to meet the specific needs of educational institutions.

For this situation, the Cisco Advanced Malware Protection Technology (AMP) could be used to detect and prevent malware across endpoints, networks, and email (Cisco, 2024). In addition, the Cisco Umbrella technology could be useful to protect users from malicious internet destinations even when they are off the campus network, providing a first line of defense against threats on the internet (Cisco Umbrella, 2024).

4.1.2 Campus Optimization: Hybrid Learning, Student Experiences & Sustainability

In the planning stage of Campus Optimization, opportunities for improvement should be identified and reported. We aim to recommend the use of certain technologies to mitigate the challenges previously described. These technologies can include simple theoretical frameworks for development, existing technologies, or even solutions already developed.

The first step of the planning responds to the evaluation of the current technologies that the university has and that aim to solve these issues. This will help identify which are the most important points for improvement, establish clear and measurable objectives, and find technical, economic, or infrastructure limitations. The second stage, defining the interested parties in the process and collecting insights and suggestions. This proves useful in identifying stakeholders, assessing risks, and ensuring acceptance of changes.

Challenge 1: Deficient in the “Reserve Study Spots” System

To address this challenge we propose the utilization of a solution already developed and implemented by Cisco mainly in work contexts; “*Cisco Smart Workspaces*”, this technology aims to solve space utilization problems, allowing up-to-the-minute information on occupancy, environmental data, and booking spaces. It allows through the use of a variety of sensors and screens, an improved experience for the user, making the whole process much more efficient and satisfactory. At the same time, the university can gain knowledge regarding capacity management, energy efficiency strategies, and productivity improvement. Specifically, this technology is made up of sensor systems and touch screens positioned inside the buildings that have all the information required by the user. It also has a 3D map that facilitates the user's understanding, visualization, and interaction with the data (Cisco Spaces, 2024). This technology can greatly resolve the challenges identified on campus and can be easily implemented.

Challenge 2: Reinforce Hybrid-Learning

This particular challenge has many aspects that can be addressed, but in this case, we want to emphasize digital learning platforms. We believe that Erasmus digital platforms and LMS (Learning Management System) can be improved with the addition of Virtual Reality, through software that connects these platforms and said technology. The incorporation of Virtual Reality in university LMS platforms can enrich student learning through practices such as virtual laboratories, which allow the simulation of "real conditions" bringing students closer to their respective disciplines and allowing them to develop skills that will be useful in their work fields. VR can also facilitate the understanding of abstract concepts. Finally, it can facilitate the inclusion of students with disabilities or who have difficulties attending campus without taking away from their learning experience. There are many benefits of improving LMS, boosting knowledge retention, reducing training costs, and providing unlimited access to learning content anywhere, in this sense it is a useful tool that can help reinforce hybrid learning in the university context. Specifically, we propose that Cisco develops software that can connect the current LMS platforms with VR technologies that already exist and can be adapted for a learning environment.

Challenge 3: Ensure Sustainability

We believe that Cisco already has the technologies to solve this challenge on several fronts. Firstly, the development or implementation of solutions for the last two challenges mentioned already allows for more efficient use of energy resources, smart building designs that enable hybrid work, or efficient use of spaces that have already proved to be helpful in the reduction of energy use. On the other hand, we believe that Cisco should opt for a combination of hardware and software that help boost energy savings and other sustainable resources. Among these technologies are PoE (Power over Ethernet), an efficient technology that simplifies the deployment of networked devices by delivering power and data over a single Ethernet cable (Cisco, 2024), and an IoT platform, that includes cameras, sensors and computer vision analytics that provides the university with all the data they need to develop and implement resource-saving programs.

Before diving into the implementation section, provided below is a table that neatly presents the identified challenges and proposed solutions.

Physical & Cyber Security		Campus Optimization (Hybrid Learning & Sustainability)	
<i>Challenges</i>	<i>Proposed Solution</i>	<i>Challenges</i>	<i>Proposed Solution</i>
Physical Security - Identity Authentication	Identity badges & ISE	Deficient “Reserve Study Spots” System	‘Cisco Smart Workplaces’
Threat of Cyber-Attacks	Evaluation of past incidents & active implementation of identified Cisco Technologies	Reinforce Hybrid-Learning	Explore possibilities in VR in combination with University LMS
		Sustainability	Acts as a guideline to all solutions

Table 2 & 3: Overview of challenges

4.2 Implementation

The implementation phase for smart campus strategies is an important step in transforming the planning into practical, operational systems across universities. Following the selection of Cisco's technological solutions for physical and cybersecurity, sustainability, and hybrid learning, this phase focuses on the deployment of these technologies and it involves configuring, testing, and launching systems.

4.2.1 Physical Security & CyberSecurity

There needs to be a thorough assessment conducted to identify potential physical and cyber security threats to the campus environment. This assessment should encapsulate internal and external risks, including factors such as unauthorized access, data breaches, physical intrusions, natural disasters, and more.

There should be security solutions integrated to provide seamless protection across campus. This could include deploying surveillance cameras, access control systems, intrusion detection systems, fire alarms, biometric authentication, encryption protocols, and advanced network security measures to safeguard both physical assets and digital infrastructure. Combining the utilization of monitoring tools to capture the environment at all times for any signs of security threats or anomalies.

To ensure the usage of security implementations is optimized, having an established structure to aid in security governance is key. Integrating members of the campus and academic community, such as administrative, IT, and security departments, to ensure alignment with regulatory requirements and industry standards for cybersecurity and physical security. By adopting an approach that integrates physical security and cybersecurity measures with advanced technologies and collaborative governance practices, Cisco can effectively assess the complexities of deploying a smart campus and create an innovative educational ecosystem that prioritizes sustainability, safety, efficiency, and connectivity. On the physical security front, Cisco's solutions encompass a range of technologies, such as surveillance cameras, access control systems, and intrusion detection sensors, to safeguard campus premises, facilities, and assets.

By strategically deploying these physical security measures across the university campus, administrators can effectively monitor and control access to sensitive areas, mitigate security threats, and respond swiftly to incidents or emergencies. Moreover, Cisco's cybersecurity solutions are critical in protecting the university's digital infrastructure, data assets, and intellectual property from cyber threats such as malware, phishing attacks, and unauthorized access. Through advanced network security protocols, encryption techniques, and threat intelligence analysis, Cisco helps universities establish a

resilient cybersecurity posture, ensuring the confidentiality, integrity, and availability of critical information systems and services.

Overall, by integrating robust physical security and cybersecurity measures into Cisco's smart campus solutions, universities can create a safe, secure, and conducive learning environment for students, faculty, and staff, while also safeguarding against evolving threats in the digital age.

4.2.2 Campus Optimization, Hybrid Learning & Sustainability

For the implementation of these technologies, we propose a two-phase plan. The first stage “Pilot” allows the examination of the new methods and processes, on a limited scale, before investing time and money on a larger scale. The objectives of this first step include tangible goals (such as reducing energetic consumption by xx%), the establishment of a feedback system for stakeholders and university administration, selection of “starting points”, such as a specific building to start testing the software or a particular course that is going to be submitted to the new LMS with VR, and a monitoring system that permits the constant improvement of the technologies. The “Pilot Stage” should go on for a limited amount of months (3-6 months) allowing the accomplishment of all objectives.

The second stage of the implementation process is “Full implementation and evaluation” which involves the orderly and full expansion of the pilot program to the rest of campus based on the results obtained in the previous stage. The objective of this phase is the consolidation of all the improvements made in the 1st part. This includes installation in all required buildings, training of users, and a monitoring & maintenance system.

The implementation of the proposed solutions in *Campus Optimization, Hybrid Learning & Sustainability* is recommended to develop three independent plans (each composed of the two stages mentioned before). While there are links between the challenges and solutions, each technology requires specific technical aspects, and involvement from different stakeholders and main users, and allows for better monitoring of the effects of each implementation.

5. Conclusion

Cisco has established itself as a leader in the technology and telecommunications industry through strategic acquisitions, innovative products, and a strong commitment to environmental, social, and governance (ESG) principles. The concept of the smart campus, with its emphasis on interconnected systems and enhanced user experiences, aligns seamlessly with Cisco's mission to power an inclusive future for all. Cisco's initiatives in this area underscore the importance of integrating advanced technologies to enhance security, optimize campus operations, and promote sustainability. The proposed

solutions demonstrate how Cisco's technology can transform educational environments by addressing key issues such as physical and cybersecurity, hybrid learning, and sustainability. Cisco's approach to smart campuses involves a meticulous planning and implementation strategy that takes into account the complexities of modern educational environments. Through the deployment of technologies like Cisco Smart Workspaces and IoT platforms, Cisco provides universities with the tools they need to enhance student and faculty experiences, ensure sustainable practices, and maintain robust security measures. The integration of these technologies not only addresses immediate challenges but also positions educational institutions to adapt to future technological advancements.

In conclusion, Cisco's comprehensive approach to creating smart campuses offers a blueprint for the future of educational institutions.. As universities and colleges increasingly adopt smart technologies, Cisco's leadership and expertise will be crucial in shaping educational landscapes that are safer, more efficient, and more sustainable. This commitment to continuous improvement and adaptation ensures that Cisco remains at the forefront of technological innovation, driving positive change across the education sector.

6. References

1. Abdullah, S. (2023). *Cisco's Networking Trends Reshaping Global Landscape in 2023*. Medium.
<https://medium.com/@shahrabanabdullah996/ciscos-networking-trends-reshaping-global-landscape-in-2023-3bc034658093>
2. About Cisco. (2024). Cisco. <https://www.cisco.com/c/en/us/about.html>
3. Acquisitions. (2020). Cisco.
<https://www.cisco.com/c/en/us/about/corporate-strategy-office/acquisitions.html>
4. Cisco. (2023). *Cisco 2023 Annual Report: Creating a world of potential*.
https://www.cisco.com/c/dam/en_us/about/annual-report/cisco-annual-report-2023.pdf
5. Dong, Z. Y., Zhang, Y., Yip, C., Swift, S., & Beswick, K. (2020). *Smart campus: definition, framework, technologies, and services*. *IET Smart Cities*, 2(1), 43–54.
<https://doi.org/10.1049/iet-smc.2019.0072>
6. Galeano-Becerra, C. J., Bellón-Monsalve, D., Zabala-Vargas, S. A., Romero-Riaño, E., & Duro-Novoa, V. (2018). *Identificación de los pilares que direccionan a una institución universitaria hacia un Smart-Campus*. *Rev.investig.desarro.innov*, 9(1), 127-145. doi: 10.19053/20278306.v9.n1.2018.8511
7. Hunt, L., & Hunt, L. (2024). *Understanding your business landscape – Azura*. Azura –.
<https://azuramagazine.com/articles/understanding-your-business-landscape>
8. ISE Planning & Pre-Deployment Checklists. (2020, February 22).
<https://community.cisco.com/t5/security-knowledge-base/ise-planning-amp-pre-deployment-checklists/ta-p/3622635#toc-hId-1962751884>

9. *Our strategy | Cisco ESG Reporting Hub. (s.f.).*
https://www.cisco.com/c/m/en_us/about/csr/esg-hub/governance/strategy.html
10. *Ressel, D. (2023). Campuses are getting smarter. But is your institution ready for a “smart campus”?* | *EAB. (n.d.). EAB.*
<https://eab.com/resources/blog/data-analytics-blog/campuses-are-getting-smarter-but-is-your-institution-ready-for-a-smart-campus/>
11. *Serafeim, G. (2023). ESG: From process to product. Harvard Business School Working Paper No. 23-069. ESG: From Process to Product - Working Paper - Faculty & Research - Harvard Business School (hbs.edu)*
12. *Cisco Spaces. (2024, January 29). Smart workspaces for hybrid work - Cisco Spaces.*
<https://spaces.cisco.com/smart-workspaces/>
13. *Cisco Secure Endpoint Explainer video. (2024, May 15). [Video]. Cisco.*
<https://www.cisco.com/site/us/en/products/security/endpoint-security/secure-endpoint/index.html>
14. *Cisco Umbrella. (2024, March 27). Cisco Umbrella | leader in cloud cybersecurity and SASE solutions.* <https://umbrella.cisco.com/>
15. *What Is Power over Ethernet (PoE)?. (2024). Cisco.* [What Is Power over Ethernet \(PoE\)? - Cisco](#)