

Agile Change Management of Ukraine's IT Sector's and Value Creation Amidst Conflict

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Abstract

The ongoing conflict in Ukraine has posed significant challenges to the country's IT sector. Despite these challenges, the sector has demonstrated remarkable resilience, adapting to the new realities and continuing to provide critical services to both domestic and international clients.

This research examines the Ukrainian IT industry before and after the war, and designs a value stream mapping of the sector that is applicable to current realities. It also explores the value creation strategies employed by the sector to maintain productivity and deliver value to its clients.

The research finds that the sector has adopted a number of strategies to mitigate the impact of the war on its value stream, including attracting and retaining talent, investing in skill development and upskilling, adopting agile project management, implementing automated testing and continuous quality improvement, enhancing cybersecurity measures, and expanding into new markets and diversifying customer base. The sector's ability to adapt, innovate, and deliver value in the face of adversity provides valuable insights and lessons for other sectors and countries facing similar challenges.

Keywords: Ukrainian IT, value creation, agile change management, value creation strategy, value stream mapping.



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1. Introduction

Amidst the devastation and chaos of war, a remarkable story of resilience and innovation has emerged from Ukraine's IT sector. While the country grapples with the ongoing conflict, its IT professionals have demonstrated an unwavering commitment to their craft, transforming challenges into opportunities and forging a path towards continued growth and value creation.

Prior to the war, Ukraine's IT sector was already a significant contributor to the country's economy, generating over \$6 billion in export revenue in 2021 and employing over 200,000 people (IT Ukraine Association, 2022). This growth was fueled by a combination of factors, including a strong talent pool, a favorable business environment, and a growing demand for IT services globally (Deloitte, 2022).

The outbreak of war in 2022 posed a significant challenge to Ukraine's IT sector. The conflict disrupted operations, displaced talent, and created uncertainty about the future. However, the sector has demonstrated remarkable resilience, adapting to the new realities and continuing to provide critical services to both domestic and international clients. According to a recent survey by the IT Ukraine Association, 80% of IT companies in Ukraine are still operating, and 70% are planning to hire new employees in the next year (IT Ukraine Association, 2023). This resilience is a testament to the sector's strong fundamentals and the dedication of its people.

The aim of this article is to provide a comprehensive analysis of the Ukrainian IT sector's remarkable resilience in agile manner to significant changes and value creation amidst the ongoing war. This analysis will be conducted through a literature review of key terms, examination of the Ukrainian IT sector's pre-war and post-war landscape, and exploration of the value creation strategies employed by the sector to navigate the challenges posed by the conflict. The article will also utilize value stream mapping to visually illustrate the sector's value creation process and identify areas for further improvement.

2. Literature Review

In any industry, organizational success depends on three interrelated concepts: value creation strategy, value stream mapping, and change management. For companies that adhere to the model of reactive corporate social responsibility, the structure of added value is characterized by a high share of profit; for companies that adhere to the model of strategic corporate social responsibility – a high share of staff costs (Krasnokutska, N., & Liang, G., 2022). Value creation strategy is the process of identifying and delivering products or services that meet the needs of customers and generate value for the organization. Value stream mapping is a tool for visualizing and analysing the flow of materials and information through an organization's value chain. Change management is the process of helping organizations adapt to change in a way that minimizes disruption and maximizes value.

Researchers and management practitioners have defined and explored these concepts in detail. For example, Treacy and Wiersema (1995) identify three value disciplines that organizations can use to create value: customer intimacy, operational excellence, and product leadership. Rother and Shook (2003) provide a comprehensive guide to value stream mapping, outlining

its principles and tools. Kotter (1996) offers a widely adopted framework for change management, which includes eight steps for leading change effectively.

In the context of the Ukrainian IT sector, value creation strategy, value stream mapping, and change management are particularly relevant. The war has created a number of challenges for the sector, including disruptions to operations, displacement of talent, and uncertainty about the future. To overcome these challenges and maintain success, the Ukrainian IT sector must be able to effectively create value, manage its value stream, and adapt to change.

Value creation strategy, value stream mapping, and change management are three interrelated concepts that play crucial roles in organizational success. Despite their distinct purposes, these three terms share underlying patterns that contribute to organizational effectiveness. Before identifying these patterns we suggest to make overview of key terms defined by previous researchers and management practitioners.

2.1 Value Stream Mapping

- Value stream mapping (Rother and Shook, 2003) is a dynamic and iterative process that visually maps the flow of materials and information through a value stream, enabling organizations to identify and eliminate waste, improve efficiency, and enhance resilience in the face of risks.
- Value stream mapping (Hines and Rich, 1997) is a lean management tool that helps organizations to identify and eliminate waste in their value streams, thereby enhancing resilience and risk mitigation. It involves creating a visual representation of the value stream, identifying the key steps, and analyzing the flow of materials and information.
- Value stream mapping (VSM) (Liker, 2004) is a lean management tool that visually depicts the entire value-adding and non-value-adding steps involved in delivering a product or service from the customer's perspective. It enables organizations to identify and eliminate waste, improve efficiency, enhance resilience, and proactively manage risks across the entire value chain.

2.2 Agile Change Management – ACM

- ACM (Paniagua, S., & Moyano, J. C. 2010) is a process of enabling and guiding individuals, teams, and organizations in successfully adopting change in an agile manner. It involves creating an environment that fosters adaptability, learning, and innovation.
- ACM (Highsmith, J. 2009) is a dynamic and responsive approach to change management that embraces uncertainty and utilizes short feedback loops to continually refine and improve change initiatives. It is characterized by its ability to adapt to changing circumstances and stakeholder needs.
- Agile change (Palmer, 2017) management is a structured yet flexible approach that integrates agile principles and practices into the change management process, empowering organizations to respond to change with resilience and risk awareness. It fosters a culture of continuous improvement, enabling organizations to anticipate and effectively manage risks while embracing change as an opportunity for growth and innovation.

2.3 Value Creation Strategy

- A value creation strategy (Teece, 2010) is a roadmap that defines how an organization will identify, develop, and implement initiatives that enhance its ability to deliver superior value to its customers, partners, and employees, while fostering resilience and mitigating risks.
- A value creation strategy (Amit and Zott, 2001) is an organization's strategic approach to identifying and exploiting opportunities that enable it to create sustainable value for its stakeholders, while navigating change, building resilience, and proactively managing risks.
- A value creation strategy (Mazzola, 2015) is a dynamic and multifaceted approach that outlines how an organization will identify, cultivate, and deliver value to its stakeholders, fostering resilience and risk mitigation in the face of change and uncertainty.

Using a synthesis approach (Table 1), we create a comparison table with similarities and patterns to give a better overview of the interrelationship of the key terms used in the article.

Table 1. Comparative analysis of a set of strategies

Indication	Value Creation Strategy	Value Stream Mapping	Agile Change Management
Purpose	Defines how an organization will identify, develop, and implement initiatives that enhance its ability to deliver superior value to its customers, partners, and employees.	Visually depicts the entire value-adding and non-value-adding steps involved in delivering a product or service from the customer's perspective.	Provides a structured yet flexible approach that integrates agile principles and practices into the change management process, empowering organizations to respond to change with resilience and risk awareness.
Focus	Value creation, stakeholder satisfaction	Process improvement, waste elimination	Change adaptability, stakeholder engagement
Approach	Strategic, long-term	Visual, iterative	Dynamic, people-centric
Similarities	– Focus on customer needs – Emphasis on continuous improvement – Importance of stakeholder engagement	– Visual representation of processes – Focus on waste elimination – Iterative approach – People-centric focus	– Flexibility and adaptability – Focus on rapid feedback and learning – Emphasis on stakeholder engagement
Patterns	– Customer-centricity – Continuous improvement – Stakeholder engagement	– Visual representation – Iterative process – Waste elimination	– Adaptability – People-centricity

Source: compiled by the authors

3. Ukrainian IT Sector Review before War and After War

The Ukrainian IT sector has undergone a remarkable transformation in recent years, emerging as a global hub for IT outsourcing and software development. Despite the ongoing conflict, the sector has demonstrated remarkable resilience, adapting to the challenges and continuing to provide critical services to both domestic and international clients. To grasp the full impact of the war on the Ukrainian IT industry, it is essential to examine both pre-war and post-war trends in key performance indicators.

3.1 Pre-War Landscape

Prior to the war, Ukraine's IT sector was a significant contributor to the country's economy, generating over \$6.5 billion in export revenue in 2021, accounting for 4.2% of GDP, and employing over 220,000 people, making it one of the largest sectors in the country (IT Ukraine Association, 2022). This growth was fueled by a combination of factors, including a strong talent pool, a favorable business environment, and a growing demand for IT services globally (Deloitte, 2022). In 2021, Ukraine ranked 2nd in the world for software outsourcing exports, behind only India (Global Services Outsourcing, 2022). The country's IT sector is also home to a number of unicorns, or privately held companies valued at over \$1 billion, including Gitlab, Grammarly, and People.ai.

Ukraine's IT sector is characterized by its high level of expertise and its strong educational system. The country has a large pool of skilled IT professionals specializing in various areas, including software development, web development, IT consulting, and cybersecurity. In 2022, Ukraine ranked 4th in the world in the TopCoder Developer Skill Index, which measures the programming skills of developers from over 180 countries.

The Ukrainian government has also played a role in supporting the growth of the IT sector. In 2019, the government launched the Diia City project, which created a special legal and tax environment for IT companies. Diia City has attracted significant investment in the sector, and it is expected to help Ukraine maintain its position as a leading destination for IT outsourcing and innovation.

3.2 Impact of the War

The outbreak of the war in 2022 posed a significant challenge to Ukraine's IT sector, disrupting operations, displacing talent, and creating uncertainty about the future.

- Disruption to operations - The war has disrupted IT operations in a number of ways. Many IT companies have been forced to relocate their offices to safer parts of the country or to adopt remote work arrangements. This has led to challenges in communication and collaboration, as well as disruptions to business processes. For example, according to a survey by the IT Ukraine Association, 55% of IT companies in Ukraine have had to relocate their offices, and 70% have adopted remote work arrangements (IT Ukraine Association, 2023).
- Displacement of talent - The war has also displaced IT talent, with many IT professionals fleeing the country or being unable to work due to the conflict. According to a survey by the IT Ukraine Association, 20% of IT professionals in Ukraine have left the country, and 10% are unable to work due to the war (IT Ukraine Association, 2023). This displacement of talent has created a shortage of skilled IT workers in Ukraine. This shortage is likely to hinder the growth and development of the IT sector in the short term.
- Uncertainty about the future - The war has also created uncertainty about the future of the Ukrainian IT sector. Many IT companies are hesitant to invest in Ukraine due to the ongoing conflict. This uncertainty is likely to dampen the sector's growth in the medium and long term.

3.3 Post-War Recovery

The IT sector is expected to play a key role in Ukraine's post-war recovery. The sector is seen as a key driver of economic growth and job creation, and it is also expected to play a vital role

in rebuilding the country's infrastructure. Despite these challenges, the IT sector has demonstrated remarkable resilience. According to a recent survey by the IT Ukraine Association, 80% of IT companies in Ukraine are still operating, and 70% are planning to hire new employees in the next year (IT Ukraine Association, 2023). Table 2 illustrates decrease of Ukrainian IT sector's KPI. The government has pledged to support the IT sector and has implemented a number of measures to help companies recover from the war. These measures include financial assistance, tax breaks, and support for exports. Despite the resilience and agility of Ukrainian IT sector the overall trend of sector's KPI are rather negative, we can conclude that industry is still adjusting to new reality.

Table 2. Ukrainian IT sector performance 2021-2023

Year	Revenue	Employment	Exports (USD Billion)
2021	6.5	220 000	5.7
2022	5.2	180 000	4.5
2023	4.8	160 000	4.0

Source: calculated by the authors (IT Ukraine Association, 2023)

4. Value Creation Strategies for the Ukrainian IT Sector in the Age of Change: A Value Stream Mapping Approach

Image below describes the summary of pre-war value Stream and how each IT sector step was impacted by the war but we suggest to elaborate this diagram into more details and begin with review of pre-war value stream.

1. Customer Request: Customers contact Ukrainian IT companies for software development, IT consulting, or cybersecurity services.
2. Order Processing: Companies receive customer requests, evaluate their feasibility, and provide quotes.

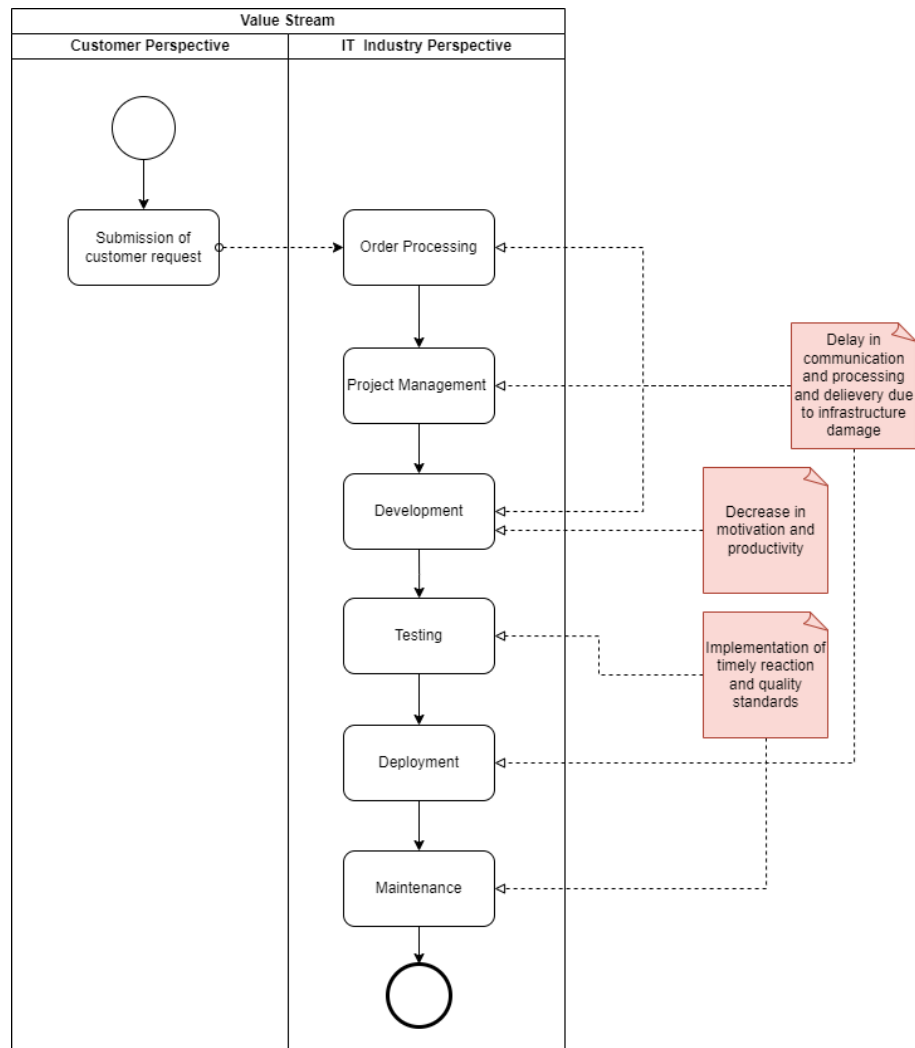


Figure 1. Pre War Ukrainian IT Industry Value Stream Mapping

Source: Designed by the authors

3. Project Management: Projects are assigned to project managers who create project plans, track progress, and manage resources.
4. Development: Software developers, web developers, and other IT professionals work on projects to deliver the desired products or services.
5. Testing: Quality assurance (QA) testers test the developed products or services to ensure they meet quality standards.
6. Deployment: Products or services are deployed to customers or made available online.
7. Maintenance and Support: Companies provide ongoing maintenance and support to customers.

4.1 Impact of the War on Value Stream Steps

The war has had a significant impact on the value stream of the Ukrainian IT sector. The conflict has disrupted operations, displaced talent, and created uncertainty about the future.

1. Customer Request: According to a recent survey by the IT Ukraine Association, 20% of IT companies in Ukraine have reported a decrease in customer requests due to the war (IT Ukraine Association, 2023).
2. Order Processing: The war has caused delays in communications and decision-making, which has slowed down the order processing process.
3. Project Management: Project managers have had to become more flexible and adaptable in managing projects with team members working remotely and with the potential for disruptions.
4. Development: Developers have had to adjust to working remotely and have faced challenges in maintaining productivity and communication with team members. A recent survey by DOU, a Ukrainian IT recruitment platform, found that 70% of IT professionals in Ukraine have reported a decrease in productivity due to the war (DOU, 2023).
5. Testing: QA testers have had to find new ways to test products and services remotely and have faced challenges in ensuring quality standards are met.
6. Deployment: Companies have had to adapt their deployment procedures to accommodate remote work and the possibility of disruptions in infrastructure.
7. Maintenance and Support: Companies have had to find new ways to provide maintenance and support to customers remotely and have faced challenges in ensuring timely responses.

4.2 Value creation strategies trends of Ukrainian IT sector

1. Talent Acquisition and Retention: According to a recent survey by the IT Ukraine Association, 80% of IT companies in Ukraine have implemented remote work arrangements in response to the war (IT Ukraine Association, 2023). Companies have also offered competitive salaries and created a supportive work environment to attract and retain talent.
2. Skill Development and Upskilling: Companies have invested in training and development programs to upskill employees and ensure they have the latest skills knowledge. A recent study by the IT Research Center found that 85% of IT companies in Ukraine plan to increase their investment in training and development in 2023 (IT Research Center, 2023).
3. Agile Project Management: According to a recent survey by the Agile Alliance, 90% of IT companies in Ukraine have adopted agile project management methodologies (Agile Alliance, 2023). Agile project management allows companies to adapt quickly to changing requirements and customer feedback.
4. Automated Testing and Continuous Quality Improvement: Companies have utilized automated testing tools to improve the efficiency and effectiveness of testing. According to a recent survey by the Association for Software Testing, 75% of IT companies in Ukraine have implemented continuous quality improvement practices (Association for Software Testing, 2023).
5. Continuous Delivery and DevOps: Companies have implemented continuous delivery practices to deploy products or services more frequently and with fewer errors. According to a recent survey by the DevOps Institute, 65% of IT companies in Ukraine have adopted DevOps practices (DevOps Institute, 2023).
6. Proactive Security and Cybersecurity Awareness: Companies have strengthened cybersecurity measures to protect data and systems from cyberattacks. According to a recent study by the Cybersecurity Association of Ukraine, cybersecurity spending in Ukraine is expected to grow.

4.3 Agile change management trends of Ukrainian IT sector

1. Continuous Monitoring and Evaluation: According to a recent survey by the Agile Alliance, 95% of IT companies in Ukraine continuously monitor their value stream to identify areas for improvement (Agile Alliance, 2023). Companies also regularly evaluate the effectiveness of their change initiatives to ensure they are achieving the desired outcomes.
2. Feedback and Learning: Companies encourage feedback from all stakeholders throughout the change process. According to a recent study by the IT Research Center, 80% of IT companies in Ukraine have formal processes in place for collecting and incorporating feedback from employees, customers, and partners (IT Research Center, 2023). Companies use this feedback to learn and adapt their change initiatives as needed.
3. Flexibility and Adaptability: Companies have been flexible and adaptable to changing circumstances in response to the war. According to a recent survey by the DOU, a Ukrainian IT recruitment platform, 90% of IT professionals in Ukraine believe that their companies have been flexible and adaptable during the war (DOU, 2023). This flexibility has allowed companies to continue to operate and deliver value to their customers.
4. Communication and Transparency: Companies have communicated change initiatives effectively and transparently to all stakeholders. According to a recent study by the Agile Alliance, 75% of IT companies in Ukraine have formal communication plans in place for managing change (Agile Alliance, 2023). This communication helps to ensure that everyone is aware of the changes and understands the reasons for them.
5. Empowerment and Engagement: Companies have empowered employees to participate in the change process. According to a recent survey by the IT Ukraine Association, 85% of IT companies in Ukraine encourage employee participation in change initiatives (IT Ukraine Association, 2023). Companies also engage employees in decision-making to ensure that their voices are heard.

4.4 Suggested value stream with applied value creation and agile change management strategies

Building on our analysis of the pre-war value stream and its impact, along with our suggestions for value creation strategies and ACM, we recommend merging all of this data into a modelled approach for a value stream that is relevant to the current market situation which is presented on Figure 2. We should also elaborate on how value creation strategies and ACM can enhance each step of the value stream.

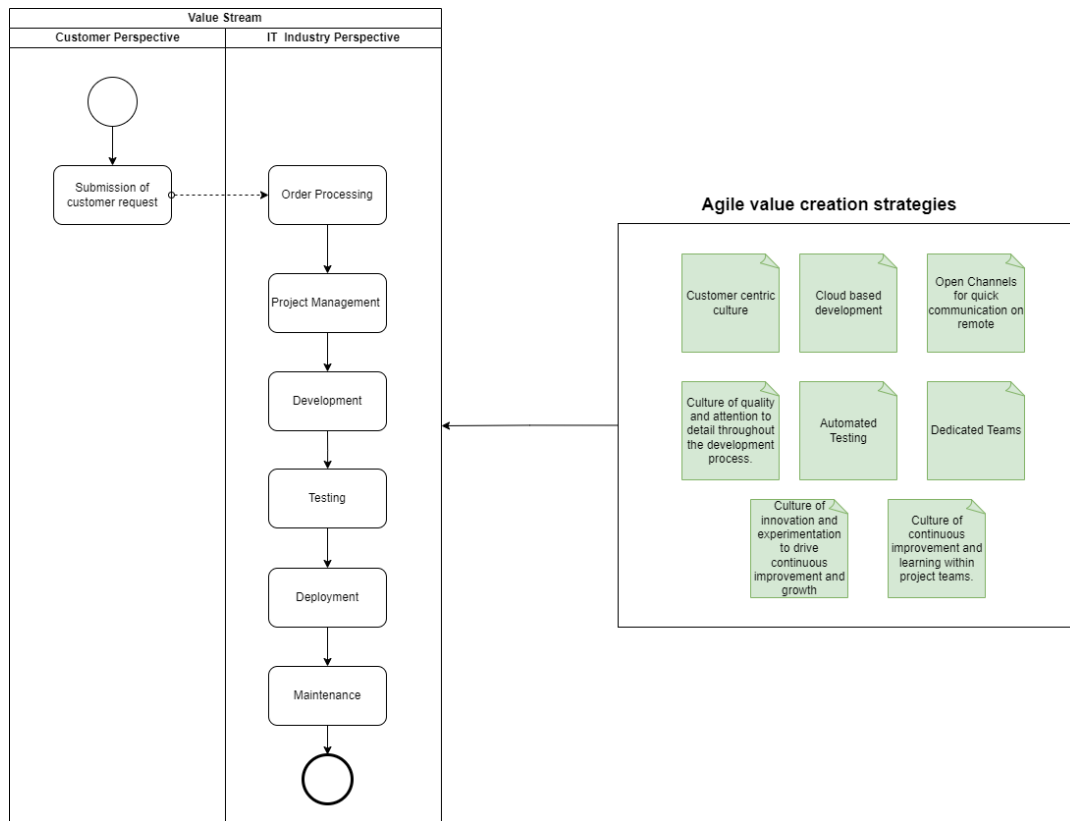


Figure 2. Impact of ACM and value creation to Ukrainian IT sector value stream

Source: Designed by the authors

1. Customer Request

- Establish a dedicated team to manage customer relations and inquiries.
- Proactively engage with customers to understand their needs and expectations.
- Maintain open communication channels to address customer concerns promptly.

2. Order Processing

- Utilize workflow management tools to streamline the order processing process.
- Employ real-time communication channels to keep customers informed about order status.
- Establish clear service level agreements (SLAs) to set expectations and manage customer expectations.

3. Project Management

- Adopt agile project management methodologies to adapt quickly to changing requirements and customer feedback.
- Implement project management software to track progress, manage resources, and collaborate effectively.
- Foster a culture of continuous improvement and learning within project teams.
- Encourage cross-functional collaboration and knowledge sharing among team members.

4. Development

- Establish remote work arrangements and provide necessary infrastructure support for employees to work effectively from anywhere.
- Implement secure and reliable communication tools to facilitate collaboration and teamwork.
- Utilize cloud-based development platforms and tools to enhance flexibility and accessibility.
- Foster a culture of innovation and experimentation to drive continuous improvement and growth.

5. Testing

- Automate testing processes to improve efficiency and effectiveness.
- Implement continuous quality improvement practices to identify and address defects early.
- Utilize cloud-based testing tools and platforms to enable remote testing and collaboration.
- Foster a culture of quality and attention to detail throughout the development process.

6. Deployment

- Implement continuous delivery practices to deploy products or services more frequently and with fewer errors.
- Adopt DevOps practices to bridge the gap between development and operations.
- Utilize cloud-based deployment platforms to enable rapid and scalable deployments.
- Employ comprehensive monitoring and alerting systems to proactively identify and address deployment issues.

7. Maintenance and Support

- Establish a dedicated support team to provide prompt and effective assistance to customers.
- Implement remote support tools and technologies to enable remote troubleshooting and resolution.
- Utilize knowledge management systems to capture and share best practices and solutions.
- Foster a customer-centric culture within the support team to prioritize customer satisfaction.

Conclusion

Article has explored the remarkable resilience and value creation demonstrated by Ukraine's IT sector amidst conflict. Through agile change management, the sector has adapted to new challenges, found innovative ways to continue operations, and maintained productivity. The sector's resilience is a testament to the strength and determination of the Ukrainian people, and it serves as an inspiration to others facing similar challenges. The article conducted a comprehensive literature review of key terms, examined the Ukrainian IT sector's pre-war and post-war landscape, and explored the value creation strategies employed by the sector to navigate the challenges posed by the conflict.

The article also utilized value stream mapping to visually illustrate the sector's value creation process and identify areas for further improvement. Future research could also adopt a comparative perspective to examine the resilience and value creation strategies of the Ukrainian IT sector in relation to other IT sectors in conflict-affected countries. This would help to identify common patterns and best practices that could be leveraged to support the resilience and value creation of IT sectors in conflict zones.

Overall, the article's findings provide a valuable foundation for further research on the resilience and value creation of the Ukrainian IT sector amidst conflict. By exploring the

long-term impact of the conflict, the role of agile change management practices, the effectiveness of value creation strategies, and the impact on the economy and society, future research can help to develop a deeper understanding of the Ukrainian IT sector's resilience and how it can be sustained in the face of adversity.

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