A woman with blonde hair, wearing a bright yellow long-sleeved shirt and a white apron, is looking upwards with a hopeful expression. She is standing in front of a glass display case or window. Inside the case, there are shelves with various items, including stacks of colorful plates (red, yellow, green) and some decorative objects. The lighting is warm and soft. A dark, curved graphic element is overlaid on the bottom left of the image, partially obscuring the woman's lower body and the shelves.

Exploring the role of digital innovation in small business competitiveness and resilience

JULY 2025



strive

ABOUT THIS BRIEF

Drawing on insights from Mastercard Strive EU Innovation Fund partners, this brief explores how AI and cybersecurity innovations enhance the competitiveness and resilience of small businesses in the EU. It outlines key impact pathways, highlights challenges identified by portfolio partners, and examines the dual nature of AI and cybersecurity. Real-world case studies illustrate how these technologies can support the EU's AI goals.

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Mastercard Strive is a portfolio of philanthropic programs supported by the **Mastercard Center for Inclusive Growth** and funded by the **Mastercard Impact Fund**. With programs in more than 20 countries around the world, Mastercard Strive aims to reach 18 million small businesses to go digital, get capital, and access networks and know-how.

Caribou is a global consultancy working with ambitious foundations, companies, and governments to accelerate and deliver impact in a digital age, applying deep technical expertise and rigor to fund and program management, strategy and policy design, impact measurement, actionable research, and immersive learning initiatives. Caribou works towards a world in which digital economies are inclusive and sustainable, driven by secure livelihoods, innovative business models, and resilience to a changing climate.

Introduction

Central to the EU's strategy for small businesses and its plans for broader economic recovery, digitalization is essential for Europe's competitiveness, prosperity, and technological sovereignty.

- **AI and cybersecurity are critical digital innovations for boosting the competitiveness and resilience of small businesses in the EU**, as highlighted by the Mastercard Strive EU Innovation Fund's initial explorations.
- **Several challenges impede the effective development and adoption of AI** by EU small businesses, including the rapid evolution of technology and concerns about return on investment and relevance among small businesses.
- **AI presents a double-edged sword for small business cybersecurity**, offering enhanced protection capabilities while simultaneously creating new vulnerabilities, necessitating integrated security measures and upskilling initiatives.
- **EU policymakers can support small businesses to overcome challenges** by understanding the unique perspectives they hold, encouraging the adoption of AI, boosting investment across the EU, and reducing the regulatory burden on small businesses.

Across the European Union, micro- and small businesses, especially those with fewer than 10 employees, are critical powerhouses. Yet these small businesses need support, particularly as unprecedented geopolitical and macroeconomic challenges in recent years have accelerated a shift toward a digital future. Central to the EU's strategy for small businesses and its plans for broader economic recovery, digitalization is essential for Europe's competitiveness, prosperity, and technological sovereignty.

Artificial intelligence (AI) is at the forefront of digital innovation across the EU. The new AI Continent Action Plan aims to support EU businesses developing AI models, improve access to data to enable businesses to scale using AI solutions, strengthen skills and drive wider adoption of AI, and simplify the AI regulatory environment.¹ AI promises to transform the way small businesses operate, innovate, and compete, resulting in increased efficiency and growth. Yet AI also increases exposure to cybersecurity threats and data protection risks.

¹ European Commission, "[Shaping Europe's leadership in artificial intelligence with the AI continent action plan.](#)"

Recognizing the important role of digital innovation to foster the EU entrepreneurial ecosystem, in 2024 the Mastercard Strive EU program launched an Innovation Fund, selecting 10 partners—EU-based startups developing innovative solutions for small businesses—that drive inclusive growth while contributing to broader goals of competitiveness and resilience within the EU and beyond.¹ Leveraging insights from these partners, this brief examines how emerging digital innovations—focusing on AI and cybersecurity—enhance small business competitiveness and resilience in the evolving EU economy, while also reflecting an approach to innovation that aligns with European values.

1 **Competitiveness** is defined as the capacity of small businesses to grow sustainably, innovate, and participate effectively in evolving markets and value chains, supported by access to finance, digital and green transitions, and integration into entrepreneurial ecosystems and support networks. **Resilience** is defined as the ability of small businesses to manage, recover from, and adapt to operational and/or financial disruptions.

AI-enabled digital innovations supporting EU small businesses

AI has immense potential for small businesses in the EU. They can use AI tools to create content, analyze data, interact with customers, and optimize processes, fundamentally reshaping their way of doing business.

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Evidence on AI's impact on small businesses and work outcomes is still emerging; however, productivity gains are a central theme.² This section presents emerging insights from the Mastercard Strive EU Innovation Fund, specifically its AI and cybersecurity innovations, on the links between AI-enabled digital innovation and small business competitiveness and resilience.³

Pathways to competitiveness and resilience

At the start of the program, our partners developed solution-specific impact pathways⁴ to test as solutions are launched and scaled. These impact pathways are a helpful tool, especially for nascent innovations such as AI, to understand how collective activities and innovation could lead to positive outputs and outcomes for small businesses in the EU.

These impact pathways and user research suggest a direct impact on small businesses' competitiveness and resilience when they test and adopt AI or cybersecurity solutions to participate in digital markets and serve their customers. We have identified six pathways within our Innovation Fund portfolio that link AI to various aspects of small business competitiveness and resilience.

¹ Mastercard Strive, "A roadmap for a resilient and prosperous Europe," November 2024.

² Mastercard Strive, "New insights, real impacts: Introducing the 2024 update of the Mastercard Strive Small Business Evidence Map," December 11, 2024.

³ To learn more about the portfolio, visit [Mastercard Strive EU](#).

⁴ Impact pathways are defined as the logical sequence of steps through which a policy, program, or intervention is expected to lead to short-term and long-term goals and outcomes. In this brief, it is the sequence of steps that a digital intervention leads to positive short-term and long-term outcomes on small businesses.



PATHWAY 1

AI adoption can lead to more efficient financial management

AI-enabled solutions improve the quality of financial reporting, cash flow management, and efficiency in accounting and reporting by integrating fragmented data, preparing standard reports, and offering relevant business analytics. Longer-term benefits include a more agile response to financial demand and an improved ability to buffer economic shocks, which impacts financial resilience.¹



PATHWAY 2

AI can lead to improved market access and competitiveness

Through AI small businesses can personalize their marketing and sales efforts and improve the value of customer relationships through deeper engagement and enhanced customer retention. AI-enabled tools can support small businesses' access to new markets and meet customer demand for new products and services.



PATHWAY 3

AI can increase industry compliance, positioning small businesses as more competitive

Compliance and adherence with regulations and industry standards are crucial for small B2B businesses, particularly in areas like environmental, social, and governance (ESG) standards. In the EU, small businesses must obtain ESG certifications to remain competitive, as reporting and transparency mandates are extended to them through larger partners and suppliers. AI can map pathways to compliance, including standardized reporting, enabling small businesses to compete with larger organizations in supply chains.



PATHWAY 4

AI can improve access to affordable finance over time

Over the longer term, Innovation Fund partners expect the improved financial management practices identified in Pathway 1 will improve access to finance for small businesses. This is achieved through enhanced decision-making, which can lead to a greater financial standing and creditworthiness, as well as increased digital data trails that can inform alternative credit-scoring models.

¹ This brief characterizes financial resilience as the capacity of small businesses to navigate both day-to-day operations and unexpected challenges, while also strategically planning for growth and future opportunities.

Coupling AI use with cybersecurity solutions strengthens these impact pathways for small businesses, enabling them to navigate AI safely. Cybersecurity solutions can also contribute to small business resilience and competitiveness through two additional pathways.



PATHWAY 5

AI-enabled cybersecurity solutions can enhance small businesses' supply chain participation by meeting security and compliance requirements set by larger partners

By automating threat detection, monitoring, and compliance, these solutions enable small businesses to more easily align with requirements. This not only levels the playing field but also enhances their competitiveness and resilience against cyber risks that could disrupt supply chain relationships.



PATHWAY 6

Cybersecurity solutions can directly enhance the resilience of small businesses

Cybersecurity can improve risk management associated with digital transition (and AI adoption in particular) and offer faster recovery from attacks. Improved solutions can protect small businesses from threats and attacks, and from financial and reputational repercussions that could undermine their financial resilience. As small businesses progress in their digital transition and integrate AI solutions across their operations, cybersecurity is an essential driver of resilience.

While these pathways identify ways AI can enhance competitiveness and resilience, they remain unproven for small businesses. Our partners are assessing these pathways as they build and launch digital solutions, using the test-learn-iterate approach that is at the core of the Mastercard Strive EU Innovation Fund. This approach will provide insights into how digital innovation can drive these outcomes within the broader innovation ecosystem, offer lessons on what works and what doesn't, and contribute evidence to refine small business-focused policy priorities. Of course, this test-learn-iterate approach is not without challenges; in the next section, our partners share the challenges they have faced in this process.



Pathways from the portfolio: How Mastercard Strive EU partners are supporting small businesses

PATHWAY 1

AI adoption can lead to more efficient financial management

- [Valerian](#)'s AI assistant, Luca, integrates accounting and banking data, analyzing and sharing financial information to small business owners on demand. Natural language processing means this integration enhances the comprehensiveness and timeliness of financial information, offering more up-to-date insights for decision-making.

PATHWAY 2

AI can lead to improved market access and competitiveness

- [Direct Market](#)'s digital agricultural marketplace utilizes AI-enabled analytics to match small agricultural producers with optimal buyers, automating workflows and providing access to supply chains that small producers are often excluded from.
- [It Goes Forward](#)'s AI-enabled solution to manage e-commerce product returns offers small businesses greater visibility into returns and reselling forecasts, in addition to providing their customers with more choice.
- [Valerian](#)'s AI assistant, Luca, acts as a "digital co-founder," bringing expertise in marketing, sales, and finance. Through integration with banking apps, e-commerce platforms, and other software tools, Luca accesses sales, marketing, and financial data to offer tailored guidance, such as performance improvements relative to small businesses' peers.

PATHWAY 3

AI can increase industry compliance, positioning small businesses as more competitive

- [Ragna](#)'s AI agent guides small businesses to take concrete actions to meet the requirements needed to obtain ESG certifications or ratings. Ragna's solution draws on ESG and sustainability research and data, regulatory frameworks, and market and internal data from small businesses.
- AI can also enable more transparent and sustainable supply chains, as [Direct Market](#)'s traceability tool demonstrates.

PATHWAY 4

AI can lead to improved access to affordable finance over time

- [tilt](#)'s AI-enabled automated data analytics solution provides banks and other financial institutions with the information needed for small businesses to unlock access to green and climate financing, which is often only accessible to larger companies.
- [Valerian](#)'s highly automated funding solution improves small businesses' access to capital.



PATHWAY 5

AI-enabled cybersecurity solutions can enhance small businesses' supply chain participation by meeting the security and compliance requirements set by larger partners

- [Cresco](#)'s AI-enabled cybersecurity solution provides small businesses with effective threat detection and prevention capabilities that were previously accessible only to larger businesses. Its solution enables small businesses to conduct penetration testing (simulating cyberattacks to identify and fix security weaknesses) and track, address, and mitigate various security vulnerabilities. It offers small businesses seamless access to a vulnerability scanner, a user-friendly dashboard, and evidence-driven reporting tools to inform their decision-making.

PATHWAY 6

Cybersecurity solutions can directly enhance the resilience of small businesses

- [Lupasafe](#)'s AI-powered cybersecurity solution will offer tailored support and on-demand advice, enabling small business owners and employees to build awareness, knowledge, and skills to adequately manage cyber risks.



Factors affecting small business adoption of digital innovation

Digital innovation—particularly AI-driven solutions—can enhance competitiveness and resilience for EU small businesses, but successful deployment comes with challenges.

Digital innovation—particularly AI-driven solutions—can enhance competitiveness and resilience for EU small businesses, but successful deployment comes with challenges. Partners must navigate complex technologies and regulations while also raising awareness and addressing adoption barriers among small business users. This section examines the key challenges and beliefs that shape small businesses' openness to digital solutions to identify levers to accelerate their digitalization across the EU.

Partner-focused challenges: Solution design and delivery

- **Rapidly evolving AI technology necessitates ongoing and onerous re-scoping of small business solutions.** Innovators must continually stay ahead by assessing new information and advancements, and adapting their scope accordingly. [Cresco](#) founder Youssef Bey summarizes the continued innovation trade-offs and decisions that our partners face: "AI is moving incredibly fast, and that's having a real impact on our project. [...] This means we need to keep adapting and making smart choices about [the technology] we use." Similarly, [IVÆKST](#) re-scoped the value proposition of its AI platform after rapid adoption of commonly used AI solutions, such as ChatGPT. IVÆKST's AI assistant, Aimie, was initially designed to assess and guide small businesses on relevant AI use cases and tools. Now, Aimie offers more specific guidance on evolving regulations and technology updates to remain relevant to small business users. For IVÆKST, its initial objective to "democratize" AI access has become less relevant.
- **Developing AI solutions for small businesses requires ongoing iteration to ensure accuracy and relevance.** Our partners continuously test the quality of AI-generated information, especially when using large language models (LLMs), to improve reasoning, prevent hallucinations, and balance detailed evidence with simple, actionable advice. Since small businesses may struggle to provide precise prompts, partners must anticipate their needs and weigh whether added transparency, like citing sources, builds trust or causes overload. Another challenge is processing text-heavy data (such as regulations, directives, or frameworks) to offer tailored guidance to small businesses. To address these challenges, [Ragna](#) is testing templates to guide small businesses in consistently entering sustainability-related data (such as energy bills). Ragna's LLM can easily interpret and analyze the information in template format to provide custom recommendations.

- **Designing effective AI solutions for small businesses requires extensive user research to align with their existing ecosystems and workflows.**

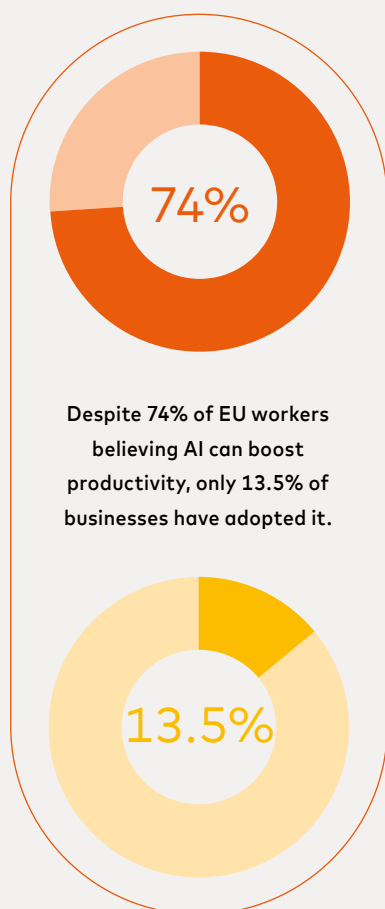
As an often-underserved segment, small businesses have specific ways of working that should be factored into solution development. Extensive user research is needed to identify and develop solutions that seamlessly integrate into existing workflows. Our cybersecurity-focused partners find that small businesses often outsource cybersecurity detection and risk management to local service providers due to a lack of in-house expertise. Instead of designing solutions that replace these local service providers, partners acknowledge the value of these existing, trusting relationships and create solutions that offer value to both local providers and small businesses.

Another challenge for partners is the small business data gap, especially for those developing AI-enabled solutions that offer ESG-related guidance. Since many small businesses lack systems to collect and manage relevant data, incentivizing data collection and supporting processes must be part of the solution. The EU's forthcoming Data Union Strategy should incorporate the needs of AI and cybersecurity innovators.¹

Small business-focused challenges: Beliefs about digital innovation

Our partners report that their EU small business users tend to hold four key beliefs that influence their willingness to integrate digital solutions into day-to-day operations. Beliefs are a critical predictor of adoption and enable our partners to assess business cases, anticipated returns, and identify strategies to increase user awareness.

- **Value of and return on investment (ROI) for digital solutions:** Small businesses often struggle to see the value and ROI of digital solutions due to competing demands. This challenge is especially pronounced for AI-enabled tools that address sustainability or climate change, such as [Ragna's sustainability assistant](#). To encourage small business adoption, solutions must clearly demonstrate both financial returns and climate benefits.
- **Relevance of digital solutions for their business:** Despite 74% of EU workers believing AI can boost productivity,² only 13.5% of businesses have adopted it.³ Current solutions don't align with small businesses' resource constraints, digital literacy, or perceived relevance. Our partners developing AI-enabled sustainability solutions, like [Ragna](#), find that small businesses don't perceive the same regulatory pressures or sense of urgency around climate issues as larger businesses. Thus, they tend to believe these solutions are less relevant to them and that other motivators are important to address.



¹ European Commission, "A European strategy for data."

² Implementing Consulting Group, "The economic opportunity of AI in the EU," September 2024.

³ Eurostat, "Artificial intelligence by size class of enterprise," April 8, 2025.

Similarly, many small business owners and staff lack awareness or underestimate the cybersecurity risks associated with digitalization.¹ Small business owners may downplay proactive measures, believing their businesses are too small to be targeted by cyberattacks. In fact, just 14% of SMEs globally are prepared for a cyberattack,² and our partners [Lupasafe](#) and [Redamp.io](#) find that small businesses underestimate the likelihood of cybersecurity breaches and associated costs.

- **Complexity and required capacity to adopt solutions:** Perceived complexity and the necessary technical capacity to adopt digital solutions can also hinder small businesses. Our partner [It Goes Forward](#), which offers a product return solution for small businesses, found that identifying potential small businesses with which to pilot their solution was often limited by the technical capacity required for integration. Similarly, implementing comprehensive AI solutions may require significant investment in technology and skilled staff, creating a barrier for small businesses operating on limited resources.³ This is also reflected in cybersecurity solutions: 47% of businesses with fewer than 50 employees have no cybersecurity budget and/or lack the resources needed to maintain, update, and adapt systems/solutions to emerging threats.⁴
- **Evolving regulatory requirements and expectations:** Small businesses may face greater difficulty navigating EU regulatory requirements and expectations, particularly those related to AI, cybersecurity, and environmental sustainability. For instance, nearly half of EU companies considering adopting AI cite the lack of clarity about legal consequences as a barrier.⁵
 - The **EU Artificial Intelligence Act** has been central to discussion, as the world's first comprehensive regulation on AI. For small businesses, navigating the complex AI regulatory framework and its implementation process can be a significant challenge. For example, considering the potential for burdensome and expensive compliance requirements for high-risk systems, small businesses uncertain about which category their AI solution falls under may choose not to deploy AI altogether. This has the potential to disincentivize lower-risk uses of AI in the EU. Furthermore, EU countries are obligated to establish regulatory sandboxes to gain a deeper understanding of these challenges and foster innovation, particularly among small businesses. It remains to be seen whether these initiatives will provide the right incentives to make them valuable to small businesses that participate. The EU has also announced an AI Service Desk to assist small businesses

1 Mastercard Strive, "A roadmap for a resilient and prosperous Europe," November 2024.

2 Astra, "51 Small Business Cyber Attack Statistics 2024 (And What You Can Do About Them)," August 2024.

3 Mastercard Strive, "A roadmap for a resilient and prosperous Europe," November 2024

4 SecureWorld, "The Alarming Cybersecurity Risks Facing SMBs," May 9, 2024

5 European Commission, Discussion Paper 210, "Artificial Intelligence: Economic Impact, Opportunities, Challenges, Implications for Policy," July 31, 2024.

in navigating these complexities¹ and has opened a consultation on how to encourage AI adoption and ease the burden of implementing the AI Act.² These initiatives support the EU's mission to simplify rules for its small business ecosystem, and testimonies from small businesses will play a crucial role in this process.

- ▶ The **General Data Protection Regulation (GDPR)**—which is already perceived by small businesses as a complicated and expensive regulatory requirement³—interacts with the AI Act in ways that are not yet clear.
- ▶ The **EU's NIS2 Directive**, a framework that upholds cybersecurity in 18 critical sectors, has expanded its scope to capture a greater proportion of medium-sized businesses. Significant discussion exists about how SMEs can meet these requirements without a disproportionate burden. Compared to NIS1, it's expected that NIS2 will affect more than three times as many firms across the EU,⁴ with firms facing estimated increased budget costs of between 12% and 22% to comply.⁵ This is particularly acute for small businesses, which are expected to face a much larger cost burden.⁶
- ▶ Compliance costs associated with the **Cyber Resilience Act**, which entered into force at the end of 2024, are also a concern, particularly for small businesses that manufacture products with digital components.

These beliefs about digital innovation are valuable for our partners to test, learn from, and iterate their solutions with small businesses, thereby building stronger business cases and more relevant value propositions. The Mastercard Strive EU program is also conducting research to gain a deeper understanding of how small businesses across the EU perceive and prioritize digital innovation as part of our forthcoming annual report on small businesses.

1 European Commission, "Shaping Europe's leadership in artificial intelligence with the AI continent action plan,"
 2 European Commission, "Commission launches public consultation and call for evidence on the Apply AI Strategy," April 9, 2025.
 3 Giorgio Presidente and Carl Benedikt Frey, Vox EU, "The GDPR effect: How data privacy regulation shaped firm performance globally," March 10, 2022.
 4 Essendi IT, "NIS 2: What businesses need to know right now."
 5 Diamatix, "How Cybersecurity Budgets Will Change with NIS2: What to Expect and How to Prepare."
 6 Frontier Economics, "Assessing the Economic Impact of EU Initiatives on Cybersecurity," July 2023.

The two sides of AI in cybersecurity

For small businesses to succeed with digital innovation, strong cybersecurity measures must complement AI use.

As EU small businesses adopt digital solutions and use AI more, they gain opportunities to enhance competitiveness and resilience. However, these opportunities come with risks. While using AI, small businesses may lack the expertise and resources to properly secure sensitive data, inadvertently violate data protection regulations, or expose competitive information. This is the two sides of AI in cybersecurity: it can make security better, but it can also introduce new vulnerabilities. For small businesses to succeed with digital innovation, strong cybersecurity measures must complement AI use.

The Mastercard Strive EU program collaborates with our Innovation Fund partners to identify and mitigate the persistent and emerging risks that AI and digital innovation present. The Innovation Fund supports AI-enabled cybersecurity solutions designed for small businesses, such as [Cresco's](#) solution.

The Mastercard Strive EU Innovation Fund connects partners working on AI solutions with those focused on cybersecurity. By learning from each other, cybersecurity partners can better understand how small businesses are using AI and the associated risks of data sharing. At the same time, partners building AI tools are learning how important it is to include strong security features, such as data protection, access management, and ensuring the systems they use, including LLMs, are secure.

As a learning community of EU startups, our Innovation Fund partners can collectively address important evolving questions, such as:

- What new risks and vulnerabilities does AI introduce to small businesses?
- How can our partners support sound AI principles, safe use of AI-supported solutions, and compliance with relevant regulations among their small business users?
- What challenges and bottlenecks does AI introduce to small businesses as they navigate regulations and industry standards? Similarly, what challenges and bottlenecks do our partners face, for instance, with respect to data protection and compliance?
- How can the EU better support small businesses in adopting AI, and how can our partners better inform policymakers?



The Mastercard Strive EU program is exploring these and other questions through the solutions our partners are testing and developing for small businesses. In this rapidly evolving landscape, the path forward for small businesses in the EU requires a concerted, sector-wide approach. These insights will be shared in the coming months in our next annual report on small businesses in the EU, and through engagement with the broader ecosystem of key stakeholders and innovators who support small businesses in the EU to thrive.



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