Grant Agreement No.: 101135632 | **Call:** HORIZON-CL4-2023-DATA-01
Topic: HORIZON-CL4-2023-DATA-01-06 | **Type of action:** HORIZON-CSA

SWOT Analysis regarding Factor 6:

INDUSTRY PARTICIPATION

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1 Context

Factor 6, "Industry Participation", focuses on the engagement, capacity and strategic alignment of European industry, from large technology and telecommunications companies to SMEs and startups. Industry participation determines whether technological capabilities developed through research translate into competitive products, services and market leadership. Without sustained industry engagement and participation, continuum technology remains confined to research environments and policy discussions rather than driving economic growth and digital transformation across sectors.

Europe possesses strong financial commitment toward computing continuum development, evidenced by substantial public and private investment in IPCEI-CIS and complementary initiatives. Over 100 industrial partners from 12 Member States are engaged in IPCEI-CIS alone, bringing diverse expertise and market perspectives. Europe maintains world-leading industry players in telecommunications (Ericsson, Nokia), automotive (Volkswagen, BMW, others) and industrial sectors that are significant potential beneficiaries of continuum technologies. However, significant weaknesses persist: limited support and resources for SMEs within initiatives; emphasis on research-driven approaches disconnected from practical industry application; weak capital markets restricting SME scaling; unclear regulatory scope creating compliance uncertainty for companies; and short-term business pressures forcing SMEs toward survival strategies rather than transformation.

The central challenge for industry participation is ensuring that continuum development serves industry needs and translates into practical business applications rather than remaining academic exercise. This requires mechanisms to include SME voices in continuum strategy, creating accessible pathways for SMEs to participate in initiatives, and establishing clear regulatory frameworks that enable rather than constrain industry innovation.

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2 STRENGTHS

2.1 Strong Financial Commitment Toward Computing Continuum Development

Europe demonstrates strong financial commitment toward computing continuum technologies through substantial public and private investment. IPCEI-CIS alone mobilises €2.6 billion in investment; Horizon Europe allocates billions for digital technology research; and Member States commit additional funding through national programmes. This financial commitment signals political and business confidence in continuum strategic importance and provides resources for sustained development.

This financial commitment is significant because developing competitive technologies requires years of investment before commercial viability. Public funding commitment provides stability that private markets alone cannot guarantee, enabling companies and researchers to make long-term investment decisions. For SMEs and startups, public funding availability (through Horizon Europe, national programmes, venture capital) provides alternative to internal cashflow constraints that otherwise limit experimentation with emerging technologies. The scale of commitment also signals to international partners (particularly Japan) that Europe is serious about continuum development, potentially justifying reciprocal international investment.

2.2 Industry Involvement Ensuring Diverse Perspectives and Expertise

The involvement of over 100 industrial partners from 12 Member States in IPCEI-CIS ensures that industry perspectives and expertise shape continuum development from early stages. Large companies contribute technical expertise and manufacturing capability; suppliers contribute component expertise; service providers contribute market understanding. This industrial diversity prevents research from becoming disconnected from practical requirements and ensures that solutions address genuine industry needs.

This industrial involvement is particularly important for SMEs because it creates opportunities for SME participation in large initiatives and access to knowledge, standards and technologies developed at initiative level. When SMEs participate in consortium projects, they gain insights into emerging technologies, establish relationships with potential partners or customers and develop capabilities for next-generation services. For the continuum specifically, industrial involvement ensures that technical architecture decisions reflect practical deployment requirements across diverse sectors rather than abstract research concerns.

2.3 Strategic Commitment to Technological Sovereignty

Europe and its industry actors are explicitly committed to technological sovereignty, maintaining European control over essential technologies rather than depending on non-European providers. This commitment reflects both geopolitical reality (recognition that technology dependence creates political vulnerability) and business opportunity (recognition that technological alternatives create market opportunities). Industry participation in sovereignty initiatives is driven not only by public funding incentives but by genuine business recognition that European market for continuum technologies will favour European providers meeting European regulatory and governance standards.

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This commitment to sovereignty is a strength because it aligns public policy and industry incentives. When industry genuinely believes that European technology development is strategically important and commercially viable, they invest accordingly. This alignment reduces the need for government mandates or artificial incentive structures; industry self-interest drives participation. For SMEs and startups, this alignment means that European continuum opportunities are not marginal niches but represent core strategic directions for larger companies and investors.

2.4 Strong Industry Players Positioned as Major Continuum Beneficiaries

Europe has world-leading industry players in sectors that are major potential beneficiaries of computing continuum technologies: automotive (Volkswagen, BMW, Daimler), telecommunications (Ericsson, Nokia, Telefónica, Deutsche Telekom), industrial manufacturing (Siemens, Philips), energy (Shell, BP) and chemicals (BASF, Bayer). These companies are increasingly recognising that Industry 4.0, smart manufacturing, predictive maintenance and supply chain optimisation depend fundamentally on continuum capabilities. As these companies' digital transformation accelerates, demand for continuum infrastructure, services and integration expertise increases, creating economic incentives for European continuum provider development.

This industrial strength provides continuum development with an anchor customer base capable of justifying sustained investment in continuum solutions. When Volkswagen commits to electric vehicle and autonomous driving development, it creates demand for edge computing, real-time data processing and distributed decision-making that drives investment in continuum technologies. Similarly, when energy companies pursue digital transformation of grid management and renewable integration, they create demand for edge computing and IoT infrastructure. For SMEs and startups, these anchor customers provide market opportunities and potential pathways to scaling.

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3 WEAKNESSES

3.1 Research-driven Approach Potentially Disconnected from Practical Industry Needs

While research investment is necessary for frontier technologies, there is risk that emphasis on research-driven innovation may disconnect technology development from practical industry applications. Large research programmes, particularly Horizon Europe projects, emphasise novel technical approaches and advance scientific knowledge but may not optimise for practical deployment, cost-effectiveness or business model viability. Companies attempting to commercialise research outputs often discover that research results do not directly address industry-prioritised problems or that integration into production systems requires extensive additional development.

This weakness constrains industry participation because companies unwilling to invest years translating research into commercial products become discouraged from research collaboration. SMEs particularly suffer because they lack internal R&D capacity to invest in research-to-production translation. The result is that promising research outputs remain confined to academic environments and do not transition into commercial products benefiting end-users. For the continuum specifically, this means that sophisticated research on continuum architectures and technologies may not result in practical continuum solutions that companies can deploy.

3.2 Limited Support and Resources for SMEs within Initiatives

Although European initiatives theoretically include SMEs, practical support and resources for SME participation remain limited. Large initiatives are designed by and for large companies and research institutions; SMEs must adapt their operations to match initiative requirements rather than initiatives adapting to SME constraints. SME participation is often limited to subcontractors to large company leads rather than as strategic partners. Funding mechanisms favour large consortia where administrative overhead is justified by project scale; small projects serving SME-specific needs struggle to secure funding.

This weakness systematically disadvantages SMEs despite their importance to innovation and market competitiveness. SMEs are pushed toward either: (a) remaining small specialists without resources for continuum scale, or (b) seeking acquisition by larger companies, resulting in consolidation rather than thriving independent SME ecosystem. For the continuum, this means that innovation opportunity space addressable only by nimble SMEs may remain unexploited, and European SMEs may fail to develop the capabilities necessary to compete as continuum matures into commercial markets.

3.3 Weak Capital Markets Insufficient to Support SME Development

Europe's capital markets remain insufficient to support SME development at scales necessary for European technology companies to achieve global significance. Venture capital is available but in smaller amounts than US markets; growth-stage funding is harder to access; and private equity is more conservative about technology sector risk than in US markets. Without adequate capital market support, European SMEs remain constrained in size and reach.

This weakness has cascading effects: SMEs cannot scale to sizes where they can employ large development teams, conduct extensive market validation or build global sales

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organisations; talented engineers and founders are drawn to US technology companies or non-European competitors where capital is more available; and continuum technology ecosystem remains fragmented across numerous small players rather than consolidating into medium-sized companies capable of sustained innovation. For the continuum specifically, capital weakness means that promising continuum startups are likely to be acquired by non-European companies or to fail rather than achieving independent viability.

3.4 Lack of Clarity and Regulatory Uncertainty Challenging for Companies

Regulatory scope and application remain unclear in many regulations affecting computing continuum companies, particularly those relating to data protection, cybersecurity, AI governance and product liability. This regulatory uncertainty creates compliance costs and delays as companies attempt to understand obligations and implement compliance mechanisms. For companies developing continuum technologies incorporating AI, open-source software or distributed processing, regulatory uncertainty compounds compliance challenges.

This weakness is particularly damaging for fast-moving startups and SMEs that lack regulatory expertise and cannot afford extended compliance discussions with authorities. Regulatory uncertainty forces them toward conservative interpretations (implementing stricter compliance than actually required) or toward non-compliance due to inability to understand requirements. The result is either higher costs stifling innovation or non-compliance creating legal exposure. For the continuum specifically, regulatory uncertainty particularly affects companies developing edge AI, open-source integration or new data processing models where regulatory boundaries remain evolving.

3.5 Short-Term Business Pressures Forcing SME Survival Strategies

SMEs face continuous pressure to achieve short-term profitability, creating tension with longer-term investment necessary for continuum technologies. SMEs often cannot afford to invest significantly in emerging continuum technologies when doing so reduces near-term revenue. This forces SMEs toward "survival mode" business strategies focused on maintaining current operations rather than transformation toward continuum capabilities. The result is that many SMEs remain locked in legacy technology modes despite recognising that continuum transition is strategically necessary.

This weakness is structural to SME economics and difficult to address through policy alone. SMEs require either access to capital enabling them to invest in transformation without sacrificing profitability, or business models and solutions making continuum adoption financially sensible without requiring subsidy. Without addressing this economic reality, continuum adoption by SMEs remains limited despite policy encouragement.

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4 OPPORTUNITIES

4.1 Automotive Industry Digitisation Through Computing Continuum

The automotive industry, one of Europe's strengths and global competitor, is facing a fundamental transformation towards electric vehicles, autonomous driving and connected car capabilities. These transformations depend fundamentally on computing continuum technologies: edge computing in vehicles, cloud processing of driving algorithms, IoT sensor networks and real-time data processing. The development of standardised data formats and exchange protocols enabling seamless communication between vehicle components and external systems can boost automotive competitiveness and accelerate transition to smarter, more sustainable mobility.

This opportunity is significant because it provides anchor market for continuum technology development. When automobile manufacturers commit to continuum-enabled vehicles, they create demand for edge computing platforms, IoT connectivity, cloud processing services and data management infrastructure. European suppliers can develop continuum solutions targeting automotive needs, then extend solutions to other sectors. Additionally, automotive leadership in continuum drives investment in related skills (autonomous systems, sensor networks, real-time processing) that benefit broader technology ecosystem. For SMEs and startups, automotive provides clear market applications and potential customers for continuum services.

4.2 Supporting European Providers of Telecommunications Equipment and Software

An opportunity exists to systematically support European telecommunications equipment and software providers through procurement preferences, regulatory streamlining and targeted R&D funding. European providers (Ericsson, Nokia and others) have capabilities in 5G/6G, edge computing and network virtualisation; supporting their continued investment ensures that European industry maintains advantages in telecommunications infrastructure. Initiatives like deployment of 10,000 edge nodes across Europe can strengthen technological autonomy while creating market demand for European equipment and software.

This opportunity is important because telecommunications infrastructure is foundational to computing continuum. European leadership in telecommunications equipment ensures that continuum infrastructure is built using European technologies meeting European standards. For SMEs and startups, European telecommunications provider strength creates ecosystem of suppliers, integration partners and service providers that generate employment and economic activity. Supporting European telecommunications providers is thus supporting entire ecosystem that depends on them.

4.3 Strengthening European Semiconductor Industry

An opportunity exists to significantly strengthen Europe's semiconductor industry through a comprehensive EU Semiconductor Strategy based on multiple pillars: funded innovation labs developing next-generation chip design and manufacturing; incentives for fabless companies (chip designers without their own manufacturing) to develop designs for European manufacturing; funding for chip fabrication facilities (fabs) focused on strategic segments

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(automotive, AI, chiplets, network equipment); support for innovation in conventional and chiplet technologies; and funding for advanced materials and 3D packaging technologies.

This opportunity addresses a fundamental vulnerability: European dependence on non-European semiconductor suppliers. A stronger European semiconductor industry enables European companies to design and manufacture chips meeting European requirements, reduces supply chain vulnerability and positions Europe as semiconductor technology leader. For the continuum specifically, semiconductors are foundational; stronger European semiconductor capabilities enable European-designed edge devices, IoT sensors and cloud infrastructure rather than depending on designs from non-European vendors.

4.4 Industry Commitment to Interoperability and Open Standards

An opportunity exists for European industry to make explicit commitment to interoperability and open standards as competitive differentiation. Companies adopting open-source software and commitment to interoperability can position themselves as alternatives to proprietary, lock-in vendor approaches. Industry commitment to interoperability can enhance collaboration and integration across different technologies and platforms. Such commitment signals to customers (particularly public sector and regulated industries) that these providers prioritise customer interests over vendor lock-in.

This opportunity leverages market dynamics where customers increasingly recognise value of interoperability and are willing to prefer providers demonstrating commitment to it. When European industry collectively commits to interoperability, it creates competitive advantage for European companies in markets valuing independence and avoiding lock-in. For SMEs and startups, explicit industry interoperability commitment creates assurance that their solutions can integrate with broader ecosystem rather than being trapped in proprietary platforms.

4.5 Leveraging Public Procurement and European Value Chains

An opportunity exists to deliberately use public procurement to support European technology providers and strengthen European value chains. By procurement preference policies favouring European providers meeting European standards and demonstrating supply chain resilience, public sector can create sustained demand enabling European providers to justify investment in innovation and scaling. Additionally, by coordinating procurement at European level rather than fragmenting across Member States, public sector can create scale economies enabling European providers to compete with larger global competitors.

This opportunity converts public procurement into strategic tool rather than purely cost-minimisation activity. While procurement-based approach cannot single-handedly create competitive industries, combined with R&D support and regulatory environment enabling innovation, strategic procurement can tip scales toward European provider development. For SMEs and startups, predictable public procurement demand provides business foundation enabling investment in growth and innovation.

4.6 Enhancing EU Computing Infrastructure Accessibility for Businesses

An opportunity exists to enhance European computing infrastructure (data centres, edge facilities, AI processing capacity) and make it more accessible to businesses, particularly

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SMEs. By developing business models where public computing infrastructure developed through research investment (Euro-HPC, AI Factories) is made available to commercial users on reasonable terms, Europe can democratise access to advanced computing resources. SMEs lacking resources to build their own infrastructure can access continuum-grade computing capacity without depending on hyperscalers.

This opportunity addresses the fundamental inequality where large companies can afford to build or procure advanced infrastructure while SMEs cannot. By making public infrastructure accessible, Europe levels the competitive playing field. For the continuum specifically, making Euro-HPC and similar facilities accessible to commercial users ensures that European companies have access to computing resources necessary to develop and deploy continuum applications.

4.7 Making Computing Infrastructures Easier and More Open for Business Use

An opportunity exists to systematically simplify access to European computing infrastructure for commercial use, reducing barriers to adoption. This includes: simplifying procurement and service agreements for companies to use public computing facilities; establishing clear, transparent pricing models; providing technical support for companies to understand how to leverage infrastructure effectively; and removing administrative burdens that make public infrastructure less attractive than commercial alternatives.

This opportunity addresses practical barriers that often make public infrastructure less attractive to companies than proprietary commercial alternatives despite policy intentions. When public infrastructure has simpler terms, clearer pricing and better support than commercial alternatives, companies adopt it naturally. For the continuum specifically, making European public infrastructure genuinely attractive to commercial users ensures that European continuum deployment benefits from publicly-supported infrastructure rather than depending entirely on private commercial alternatives.

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5 THREATS

5.1 Dependence on Foreign Vendors for Critical Technologies

Europe heavily depends on foreign vendors for critical technology components: cloud services dominated by US providers; mobile phone operating systems (Apple iOS, Android/Google); semiconductor manufacturing capacity concentrated in non-European regions; and increasingly, AI model development and deployment. This dependence creates strategic vulnerability: if foreign vendors restrict technology access for geopolitical or commercial reasons, European industry suffers direct impact. Additionally, dependence means that technology development trajectories are determined by foreign vendors rather than European companies.

This threat is structural and cannot be entirely eliminated because achieving 100% self-sufficiency in all technologies is economically unrealistic. However, reducing dependence in strategically critical domains (cloud, semiconductors, AI) is necessary for technological autonomy. Addressing this threat requires deliberate public and private investment in European alternatives in critical domains, even when such investment is economically suboptimal by short-term metrics.

5.2 Fierce Global Competition Particularly from US and China

Intense global competition, particularly from US tech giants and Chinese state-backed tech companies, poses a serious threat to European technological competitiveness. US companies have advantages of large unified market, deeper capital markets and established network effects in deployed systems. Chinese companies have advantages of state financial support, large domestic market and less restrictive regulatory environment enabling rapid experimentation. European companies face competition from both directions while operating within more constrained financial, regulatory and market conditions.

This threat is not new but has accelerated as technology competition has intensified. Creating a competitive environment without replicating the situations in US or China, without sacrificing European values in terms of regulation, labour rights, and environmental protection, is a genuine strategic challenge. Addressing this threat requires Europe to find novel competitive advantages rather than competing on same dimensions as US and China.

5.3 Regulatory Fragmentation and Lack of Member State Harmonisation

Fragmentation and lack of regulatory agreement among EU Member States create significant challenges for industry. Different Member States interpret common EU regulations differently; national regulations diverge in ways creating compliance complexity; and enforcement varies significantly. This fragmentation is particularly problematic for startups and SMEs needing to operate continent-wide. The startup environment in Europe is challenging due to regulatory mismatches making it difficult for startups to operate continent-wide; lack of tax harmonisation acts as structural barrier to development of unified European technology ecosystem.

This threat is self-inflicted through European federal structure where Member States retain authority over many regulatory domains. Unlike US where federal regulation provides uniform framework or China where central government provides unified regulation, Europe must achieve harmonisation through negotiation and consensus. When Member States prioritise

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different objectives or protect local companies through regulatory barriers, fragmentation persists. This fragmentation is structural threat to European industry competitiveness because it prevents consolidation into companies of sufficient scale to compete globally. Addressing it requires political will among Member States to prioritise European competitiveness over national protection.

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6 Synthesis

Factor 6, "Industry Participation", characterises a landscape where Europe possesses strong financial commitment to continuum development, engagement of major industry players in world-leading sectors (automotive, telecommunications, manufacturing) and explicit strategic commitment to technological sovereignty. However, significant weaknesses remain: limited support for SMEs despite their importance for innovation; research-driven approaches disconnected from practical applications in businesses; weak capital markets restricting company scaling; regulatory uncertainty creating compliance burdens; and structural economic pressures forcing SMEs to survive rather than transform.

Concrete opportunities exist to leverage anchor customers (automotive digitalization), to support critical industrial sectors (semiconductors, telecommunications), to use public procurement as strategic tool and to democratise access to computing infrastructure. These opportunities can drive industry participation and translate continuum research into commercial applications. Threats, including foreign vendor dependence, intense global competition and regulatory fragmentation, underscore need for sustained, coordinated industrial policy that supports European industry development while maintaining European competitive and ethical standards.

The central strategic question for **Factor 6** is whether Europe can create conditions enabling European industry, particularly SMEs, to develop competitive continuum businesses, overcoming structural disadvantages relative to better-capitalised, less-regulated competitors. This requires addressing not only technology and regulation but fundamental economic conditions: capital market access, market scale, business model viability and talent availability. Without addressing these economic conditions, even excellent technology will not translate into industry competitiveness.

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