Orchestrating Strategic Control Points in Layered AI Ecosystems: Insights from Startup Founders and Investors

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Abstract

The rapid rise of artificial intelligence (AI) has reshaped how digital businesses compete and collaborate. For startups, succeeding in this evolving landscape requires more than strong technology. It demands strategic defensibility within complex ecosystems. This thesis investigates how AI ventures can build and sustain competitive advantage by orchestrating control points as positions of influence over data, infrastructure, user access, and ecosystem relationships across the AI value chain.

Drawing from theory on digital ecosystems, modularity, and dynamic capabilities, the study builds a four-step structured framework to understand control points across seven layers of the AI value chain: Hardware infrastructure, cloud compute, data, foundation models, machine learning operations, applications, and services. Using nine expert interviews with venture capitalists and AI founders, the thesis identifies which control points matter most at each layer, how different actors such as AI giants, enablers, creators, and integrators use them, and how startups can align their strategy accordingly.

The result is a practical and intuitive framework that helps ventures assess where they can build defensibility not necessarily by owning the whole stack but by combining accessible control points in smart and adaptive ways. The study highlights that dynamic capabilities like agility, ecosystem integration, and technical know-how are key to sustaining relevance over time. It also shows that strategic control is less about ownership and more about orchestration and positioning within a layered and fast-moving AI environment.

Title: Orchestrating Strategic Control Points in Layered AI Ecosystems: Insights from Startup Founders and Investors

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Keywords: AI ecosystem**,** Strategic control points**,** Venture strategy**,** Moat, Defensibility**,** Dynamic capabilities**,** Layered architecture**,** Startup positioning

Sumario

A ascensão acelerada da inteligência artificial (IA) transformou a forma como empresas digitais competem e colaboram. Para startups, ter sucesso nesse cenário em constante evolução exige mais do que apenas tecnologia avançada. É necessário construir defensibilidade estratégica dentro de ecossistemas complexos. Esta dissertação investiga como empreendimentos de IA podem construir e manter uma vantagem competitiva por meio da orquestração de pontos de controle posições de influência sobre dados, infraestrutura, acesso ao usuário e relações no ecossistema ao longo da cadeia de valor da IA.

Com base em teorias sobre ecossistemas digitais, modularidade e capacidades dinâmicas, o estudo desenvolve um modelo estruturado de quatro etapas para compreender os pontos de controle em sete camadas da cadeia de valor da IA: infraestrutura de hardware, computação em nuvem, dados, modelos fundacionais, operações de machine learning, aplicações e serviços. Através de nove entrevistas com investidores de risco e fundadores de startups de IA, a tese identifica quais pontos de controle são mais relevantes em cada camada, como diferentes tipos de atores como gigantes da IA, facilitadores, criadores e integradores os utilizam, e como startups podem alinhar suas estratégias.

O resultado é um modelo prático e intuitivo que ajuda empreendedores a avaliar onde construir defensibilidade, não necessariamente por meio da posse total da pilha tecnológica, mas pela combinação inteligente e adaptativa de pontos de controle acessíveis. O estudo destaca que capacidades dinâmicas como agilidade, integração no ecossistema e conhecimento técnico são fundamentais para manter relevância ao longo do tempo.

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Palavras-chave: Ecossistema de IA**,** Pontos de controle estratégicos**,** Estratégia de venture**,** Defensibilidade**,** Capacidades dinâmicas**,** Arquitetura em camadas**,** Posicionamento de startups

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List of Abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
ASIC	Application-Specific Integrated Circuit
CP	Control Point
CPU	Central Processing Unit
DBE	Digital Business Ecosystem
FPGA	Field-Programmable Gate Array
GPT	Generative Pre-trained Transformer
GPU	Graphics Processing Unit
IaaS	Infrastructure as a Service
IT	Information Technology
MLOps	Machine Learning Operations
OEM	Original Equipment Manufacturer
PaaS	Platform as a Service
RLHF	Reinforcement Learning from Human Feedback
SaaS	Software as a Service
SME	Small and Medium-sized Enterprises
TPU	Tensor Processing Unit
VC	Venture Capital

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1. Introduction

The rise of artificial intelligence (AI) has reshaped digital markets and altered the foundations of how firms compete, collaborate, and create value. As digital business ecosystems have evolved, they have come to rely less on proprietary physical assets or traditional distribution channels, and more on modular architectures, data infrastructure, and platform governance. In these environments, strategic advantage is increasingly tied to ecosystem positioning. Control over data, user access, standards, or infrastructure layers becomes a central source of leverage. For AI-driven startups, the challenge is particularly acute. They must compete in markets where incumbents can rapidly imitate innovations and reinforce their positions through scale, regulatory familiarity, and pre-existing networks.

In these contexts, startups face pressure to establish defensible positions, often referred to as moats, before larger firms replicate their technology or absorb their niche. The most durable moats in digital AI markets are often "strategic control points". Incumbent firms can use scale, established networks, and regulatory familiarity to dominate these levers, so early-stage ventures face pressure to build ecosystem power from scratch. Meanwhile, venture capitalists (VCs) investing in AI startups must evaluate these unconventional advantages: assessing whether a startup truly controls a valuable ecosystem node or risks being a replaceable feature on another firm's platform. Standard metrics used in early-stage investment, such as team quality or market size, are poorly equipped to assess this kind of ecosystem power, which depends on relational structures, feedback loops, and market architecture.

Academic research has examined related phenomena. The literature on digital business ecosystems has examined modularity, co-evolution, and platform governance. Research on innovation strategy has focused on dynamic capabilities and bottlenecks as drivers of value capture. More recently, AI has been described as a general-purpose technology with the potential to restructure markets. Yet these perspectives have rarely been integrated. Few studies have explored how strategic control points emerge within AI-driven ecosystems, or how such positions are interpreted by investors and founders. As a result, the concept of strategic control remains under-theorised in the context of early-stage AI ventures, leaving a gap in both academic understanding and practical evaluation.

This thesis addresses that gap by developing a structured, theory-informed Four-Step Framework that helps ventures assess, configure, and adapt strategic control points across layered AI ecosystems. The framework synthesizes conceptual insights with empirical data to support founders and investors in building defensible positions in fast-evolving markets. The study combines conceptual synthesis with empirical insights from expert interviews, bridging the perspectives of startup founders, venture capitalists, and industry analysts. Its goal is to support a more systematic understanding of how defensibility can be built and maintained within layered, rapidly evolving AI markets.

The study is guided by the following overarching research question:
How can ventures operating in the AI ecosystem build and sustain strategic defensibility by orchestrating control points across the AI value chain?

To answer this, four sub-questions guide the structure and analytical depth of the thesis:

1. Which control points are regarded as most critical by key ecosystem stakeholders (VC investors and founders) across seven AI value chain layers?
2. How do strategic actor types (AI Giants, Enablers, Creators, Integrators) differ in the way they acquire and leverage control points?
3. What dynamic capabilities enable ventures to sense, seize, and transform control points over time?
4. How can the findings be synthesized into a practical framework that supports early-stage AI ventures in building defensible positions?

The structure of this thesis is as follows: Chapter 2 reviews the theoretical foundations, including the architecture and dynamics of digital AI ecosystems, platform modularity, control points, dynamic capabilities, and venture capital perspectives on defensibility. Chapter 3 outlines the research design, interview methodology, and data analysis approach. Chapter 4 presents the empirical findings, mapping control points across the AI value chain and actor types. Chapter 5 discusses these results considering the research questions, integrating insights on defensibility, core-periphery dynamics, and investor expectations. Chapter 6 concludes the thesis by summarizing its contributions, outlining implications for theory and practice, and suggesting avenues for future research.

2. Theoretical Framework

This section introduces a conceptual foundation to analyse strategic control and defensibility in digital AI ecosystems. It integrates existing ecosystem theory with a layered AI architecture and recent work on control points (CPs) to provide an analytical lens for the empirical investigation. This provides a foundation for understanding how artificial intelligence, as a modular and data-driven technology, reshapes ecosystem dynamics and creates new loci of strategic control. The following section explores this shift in greater detail.

2.1 Architecture and Dynamics of Digital AI Ecosystems

The concept of business ecosystems, introduced by Moore (1993), describes firms as co-evolving networks of interdependent actors. Later, digital business ecosystems (DBEs) were framed as open, decentralized infrastructures enabling innovation, particularly for SMEs. Jacobides et al. (2018) further conceptualized ecosystems as organizational forms defined by complementarity, modularity, and interdependence among firms. DBEs represent digitally mediated environments where firms, users, and partners interact through data flows and modular platforms.

AI systems transform digital platform ecosystems by introducing predictive and generative capabilities. These systems rely on modular-layered architectures (Yoo, et al., 2010) and orchestrators that manage data, standards, and value flows (Ghazawneh & Henfridsson, 2024), amplifying the strategic relevance of data and algorithms as core assets (Akter & Michael, 2020). The artificial intelligence ecosystem represents a new type of digital ecosystem, characterized by dynamic interdependencies between developers, producers, and users (Jacobides, et al., 2021). Foundation models are emerging as core infrastructure for digital economies, requiring a closer look at structural components and strategic actor positions (Schrepel & Pentland, 2024).

AI ecosystems operate through modular-layered architectures, where physical, software, and service components interact via interoperable interfaces (Yoo et al., 2010; Bohnsack et al., 2024). In addition to these domains, AI systems can also be structured into technical layers. The architecture of modern AI systems can be structured into distinct technological layers, aligned with the AI value chain, which helps to identify where control emerges. This structure

builds on a synthesis of established models (Heeks and Spiesberger, 2024; Gambacorta and Shreeti, 2025; Schrepel and Pentland, 2024).

1. The **infrastructure and hardware layer** includes specialized processors (such as GPUs, ASICs, FPGAs), servers, and networking technology crucial for AI computation and training. It is the physical backbone of the AI value chain. It also comprises supporting systems such as energy infrastructure and telecommunications networks, which are critical for ensuring performance, scalability, and access. This layer forms the physical and systemic foundation of the AI value chain (Gambacorta and Shreeti, 2025; Heeks and Spiesberger, 2024).
2. **Cloud platforms and compute resources** deliver scalable, remote computation and storage essential for building, training, and deploying AI models. The dominant providers are major tech companies enabling various AI workloads.
3. The **data layer** encompasses the processes of collecting, labelling, storing, and preparing large, high-quality datasets necessary for training AI models. Both sources note the fundamental role of suitable training data in AI development.
4. **Foundation models** refer to advanced, large-scale AI models (e.g., language models, multimodal models) pre-trained on substantial datasets and can be adapted for diverse applications. Building foundation models is highly resource-intensive and pivotal to the AI value chain.
5. The **Machine Learning Operations (MLOps)** refer to all tools, practices, and workflows for reliably developing, deploying, scaling, and maintaining machine learning models in production.
6. The **application layer** consists of the practical, user-facing solutions built on top of foundation models and infrastructure. These range from chatbots and productivity tools to industry-specific applications and platforms.
7. The **service layer** covers implementation support, consulting, integration, and management services that ensure organizations can adopt and gain value from AI solutions. While technical processes such as reinforcement learning, fine-tuning, and feedback loops are often associated with the MLOps layer (Gambacorta and Shreeti, 2025), their design and application can also fall within the service layer, especially when domain-specific integration or client-facing feedback mechanisms are involved (Heeks and Spiesberger, 2024).

Unlike linear value chains, AI ecosystems are shaped by platforms, data flows, and orchestrators that govern interactions. Data, once external, becomes an internal asset under platform control, shifting value capture in favor of central actors (Clough & Wu, 2020). The AI ecosystem has given rise to novel orchestration logics that differ from traditional platform management approaches. Weber et al. (2024) identify four distinct orchestration logics: platform resourcing, data-centric collaboration, distributed refinement, and application brokering. Major technology firms hold strategic control over infrastructure and application layers (Jacobides, et al., 2021). Network effects in AI depend not on user quantity but on data quality, which can be retained even if users exit (Clough & Wu, 2020). This leads to powerful data-centric feedback loops.

Jacobides et al. (2021) provide a structured typology to analyse the strategic positioning of firms within the artificial intelligence ecosystem. At the foundational level, **AI Enablers** supply essential technological infrastructure, including hardware such as semiconductors and sensors, and data processing capabilities. These components form the basis for AI development but are not AI-specific themselves. **AI Giants** operate across the entire AI stack, developing AI in-house for internal and external use. Companies such as Google, Amazon, and Alibaba not only develop proprietary AI but also commercialize surplus capacity as cloud services or AI tools. They maintain dominance through vertical integration and strategic acquisitions. **AI Creators** specialize in developing AI solutions tailored to third-party needs. While they often depend on infrastructure provided by AI giants, they add value by customizing models for specific applications. In contrast, **AI Integrators** or **Traders** do not generate AI themselves but commercialize and embed existing solutions into client ecosystems. Their role lies in bundling, branding, and ensuring technical integration. This typology underscores the diverse strategic logics within AI ecosystems and highlights how control over specific layers of the AI stack informs value creation and capture.

Control in AI ecosystems is fluid and can shift across layers. For example, control over infrastructure is often held by AI enablers, while the service and application layers are increasingly dominated by integrators. Value capture depends on occupying interfaces between layers, where firms can dictate standards or restrict access (Yoo et al., 2010; Bohnsack, et al., 2024).

In AI ecosystems, CPs are not confined to proprietary ownership but reflect a firm's ability to influence interdependencies across layers and actors. The ecosystem logic of modularity, openness, and orchestration amplifies the strategic relevance of such positions. This section outlines the layered architecture and actor dynamics of AI ecosystems. Understanding these structural features is essential to identifying where strategic CPs emerge and how they can be leveraged for defensibility.

2.2 From Bottlenecks to Strategic Control Points in the Digital Era

The idea of strategic control points has its roots in earlier concepts of bottlenecks and complementary assets in business. In traditional industrial value chains, a firm that controlled a critical bottleneck resource or gateway could extract disproportionate profits (Teece, 1986). As value creation has shifted toward digital ecosystems, strategic advantage is now determined less by asset ownership and more by a firm’s ability to secure key architectural or relational positions within layered, modular structures (Bohnsack, et al., 2024; Jacobides, et al., 2018).

Digital business ecosystems are characterized by interdependent components such as hardware, data, applications, and services. These elements interact across layers via interoperable interfaces. Strategic control points have emerged as critical positions where firms can govern access, shape interactions, and influence value capture across these layers. Examples include API gateways, platform standards, and exclusive user data pipelines (Bohnsack, et al., 2024).

Yoo et al. (2010) and Hylving and Schultze (2020) conceptualize digital CPs as interfaces between layers in modular system architectures. Bohnsack et al. (2024) extend this model by proposing a typology of four CP categories: technical, strategic, generic, and institutional, which together shape innovation and value capture within digital ecosystems.

Technical control points include digital infrastructure, data, content, and unique solution. Digital infrastructure refers to the connective architecture enabling seamless interactions, such as APIs or cloud backbones. Data represents proprietary information assets that offer competitive advantage through exclusive insights and training inputs. Content includes digital resources that create value in the ecosystem. Unique solution are proprietary technologies or models that solve distinct problems and often result from deep domain expertise (Bohnsack, et al., 2024).

Strategic control points reflect organizational and relational mechanisms for value capture. These include Orchestration, Customer Access, Brand, Networking, Agility, Know-How, and Fnancial Resources. Orchestration describes a firm's ability to coordinate ecosystem actors, often through platform rules or integration points (Bohnsack, et al., 2024; Jacobides, et al., 2018). Customer access refers to direct control over user interfaces, data collection, or channels that link end-users with AI output (Cusumano, et al., 2019). Brand and reputation provide signals of reliability, especially in trust-sensitive environments (Bohnsack et al., 2024; DCA, 2024). Networking includes strategic alliances and participation in standards development (Cusumano et al., 2019; Eaton & Elaluf-Calderwood, 2015). Agility enables firms to respond quickly to shifts in technology and regulation (Ameen, et al., 2024). Know-how refers to specialized expertise, including regulatory and domain-specific AI knowledge (Bohnsack et al., 2024; Benyayer & Zhong, 2023). Financial resources allow firms to invest in infrastructure, talent, and scaling efforts (Kenney & Zysman, 2020).

Generic control points represent baseline requirements for ecosystem participation and interoperability. Modularity enables actors to integrate their solutions within existing architectures, allowing for scalable and combinable innovation. In AI, modular design facilitates the development of independent components for data processing, model training, and inference (Dowling, 2024). Scalability refers to the ability to expand system performance without redesign, which is essential for moving from proof-of-concept to production systems (Aue, et al., 2023).

Institutional control points define external boundary conditions set by regulation and public intervention. Market design refers to regulatory frameworks that shape competition and access within ecosystems, including standards for data use and infrastructure (Bohnsack, et al., 2024). State intervention involves direct government support aimed at reducing entry barriers and accelerating ecosystem development.

This typology highlights the multi-dimensional nature of control within AI ecosystems. Technical CPs enable innovation, while strategic CPs govern value capture. Generic and institutional factors serve as foundational enablers. Together, these categories offer a comprehensive lens for analysing how AI startups and incumbents build and defend positions in dynamic, layered ecosystems.

2.3 Ecosystem Positioning: Core vs. Periphery Roles

The distinction between core and periphery roles provides a framework to understand how technological capabilities and strategic influence are distributed within AI ecosystems. In AI ecosystems, core firms provide foundational technologies, set standards, and control infrastructures. Peripheral actors build on these assets for specific applications (Jacobides, et al., 2021).

Gargiulo et al. (2023) show that a few super core technologies such as neural networks, machine learning, and deep learning dominate the AI landscape. These constitute the central drivers of innovation in AI ecosystems. In contrast, peripheral areas include domains like agriculture or law that rely on but do not shape core development (Gargiulo, et al., 2023).

Jacobides et al. (2021) argue that core firms occupy privileged positions to orchestrate the ecosystem and set interaction rules. Peripheral actors, while important for innovation, depend on upstream technologies and have less influence. This core-periphery perspective highlights structural asymmetries in control and innovation. It also informs where entrepreneurial ventures may find realistic opportunities to establish and defend CPs within the AI value chain.

2.4 Dynamic Capabilities as a Mechanism for Defensibility

In rapidly evolving AI ecosystems, adaptability is a critical source of competitive advantage. Dynamic capabilities refer to a firm's ability to sense emerging opportunities, seize them through strategic action, and transform internal structures in response to environmental change (Teece, 2007). These capabilities differ from static resources by enabling the continuous renewal of strategic positions, which is essential in layered and modular environments such as AI.

This adaptability is closely linked to the concept of CPs. While a startup may temporarily occupy a strategic position, such as exclusive access to data, proprietary models, or infrastructure, this position can erode quickly without mechanisms for adjustment. Dynamic capabilities therefore function as an underlying mechanism that allows firms to sustain, evolve, or reposition their CPs over time (Warner & Wäger, 2019).

Teece (2007) identifies three interrelated processes. Sensing involves detecting shifts in technology, regulation, or customer needs, for example, the rise of foundation models or new data governance norms. Seizing refers to the mobilization of resources through product development or ecosystem partnerships. Transforming describes the reconfiguration of organizational assets and structures to stay aligned with shifting value flows (Teece, 2007). In digital environments, these processes support proactive innovation, continuous learning, and strategic realignment. They also enable firms to remain responsive to ecosystem-level change, especially when they are embedded in knowledge networks and industry feedback loops (Pavlou & El Sawy, 2011).

CPs, such as access to interfaces or infrastructure layers, can be interpreted as outcomes of effective sensing and seizing. Their defence over time depends on a firm's ability to detect value migration and act decisively (Bohnsack et al., 2024). Prior research suggests that organizational routines for experimentation, partnership formation, and technical exploration strengthen these capacities, particularly in platform-driven environments (Linde, et al., 2021).

Dynamic capabilities explain how ventures can adapt and reposition their CPs over time. This conceptual bridge is vital for understanding how defensibility can be sustained amid technological and ecosystem change.

2.5 Venture Capital Perspectives on Defensibility in AI Ecosystems

Venture capital investors define defensibility as a startup's ability to sustain competitive advantages that protect its position over time. In AI ecosystems, this often involves control over strategic assets such as proprietary data, infrastructure access, or distribution channels, which are difficult for competitors to replicate (Joquino, 2025; Azoulay et al., 2024).

Kampmann (2023) highlights that defensibility is not only structural but also symbolic. Investors increasingly evaluate startups based on intangible assets like proprietary algorithms, exclusive datasets, and the prestige of founding teams. Since AI models cannot be easily protected through conventional intellectual property rights, venture capitalists focus on source code, model architectures, and the technical credibility of team members as signals of defensibility (Kampmann, 2024).

A complementary operational view is provided by Bessemer Venture Partners, which outlines five core control points: data network effects that improve models through usage, exclusive data integrations, optimized technical infrastructure, deep embedding in customer workflows to raise switching costs, and talent-driven innovation cultures that foster adaptability (Kraus & Cheatham, 2023).

This section contributes to answering the research question by clarifying how elements such as digital CPs, dynamic capabilities, and actor positioning shape the strategic defensibility of ventures across the AI value chain. It sets the conceptual groundwork for empirically assessing where and how such control can be gained and sustained.

3. Methodology

Exploring how ventures and other strategic actors establish control points within layered AI ecosystems requires a clear view of the assets and positions that create lasting advantage. Focusing on the intersection of value chain layers, competitive dynamics, and actor roles allows for a differentiated view of where and how control can be gained. In AI markets, where power is often concentrated among platform leaders, smaller players must develop targeted strategies to establish and defend their own CP-based moats.

3.1 Research Design and Logic

The central aim is to develop an intuitive, practitioner-oriented framework that helps AI ventures think about strategic advantage from a control-point (CP) perspective. Because the topic is nascent, theoretically under-specified, and embedded in a fast-moving technological context, an exploratory, qualitative, inductive design is appropriate (Creswell, 2013; Gioia, 2013). Semi-structured interviews with investors and founders served as the core data source. This method is well-suited to reveal ecosystem-level dynamics, perceptions of defensibility, and the logic behind venture strategies in a fragmented and fast-changing market like AI. The research design is based on a theory elaboration approach: extant concepts (CPs, AI value chain, actor taxonomy, dynamic capabilities) provide sensitising constructs, but the study remains open to discovering novel relationships and boundary conditions. Figure 2 illustrates this sequential flow:

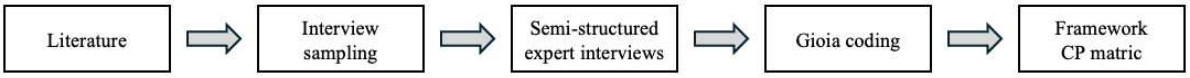

Figure 1. Research-Design Flow

3.2 Data Collection

The empirical backbone is a set of nine expert interviews with early-stage investors and AI startup founders. These two groups were selected to capture complementary viewpoints: founders articulate strategic decisions and operational realities, while venture capitalists offer a more systemic perspective on value creation, defensibility, and ecosystem evolution.

Participants were selected through purposive sampling. Inclusion criteria focused on depth of involvement in AI ventures, variety of ecosystem roles and strategic insight into firm-level and ecosystem-level dynamics. The final set included investment managers and associates from early-stage funds together with chief-executive, chief-operating and business-development leads from AI ventures. Table 1 provides an overview of the interviewees.

Table 1. Overview of Interviewees and their Background

Company pseudonym	Initial type and scope of activitie	HQ	Interviewees
Venture Capital Fund A	Early-Stage Tech-Investor	DE	Associate
Venture Capital Fund A	Early-Stage Tech-Investor	DE	Associate
Venture Capital Fund A	Early-Stage Tech-Investor	DE	Associate
Venture Capital Fund B	Early-stage B2B software investor	DE	Investment Manager
Venture Capital Fund B	Early-stage B2B software investor	DE	Investment Manager
Pre-Seed Startup	AI-logistic Startup (Stealth mode)	DE	CEO/Co-Founder
Seed Startup	Reinforcement Learning Fine-Tuning (AI)	USA	COO/Co-Founder
Series A Startup	Personalized Health Checkups (AI)	DE	Business Development
AI-Powered Operators	Natural Supplement Producer (AI-Advisor)	DE	CEO/Co-Founder

Interviews were conducted either in person or remotely via Zoom or Microsoft Teams between June and July 2025. The duration ranged from 30 to 150 minutes, depending on the depth of discussion and the availability of the interviewee.

The interview guide translated the sensitising constructs into open prompts through a concept matrix that is presented in Figure 3 based on the theoretical framework outlined in Chapter 2. The matrix includes key constructs such as CPs, AI value chain layers, actor roles, ecosystem centrality, and dynamic capabilities. Each construct was linked to a definition, its theoretical source, associated layers or actor groups, and its relevance to strategic positioning.

Table 2. Concept Matrix (for Interview Design & Coding)

	Control Points (CPs)	Actor Roles	AI Value Chain Layers	Core vs. Periphery	Dynamic Capabilities	VC Logic
Theoretical Source	Bohnsack et al. (2021)	Jacobides et al. (2018, 2021)	Heeks & Spiesberger (2024), Gambacorta & Shreeti (2025), Schrepel & Petland (2024)	Gargiulo et al. (2009); Jacobides et al. (2021)	Teece (2007); Helfat et al. (2009)	Joquino (2025); Azoulay (2024); Kampmann (2024); Kraus & Chatham (2023)
Chapter Introduced	2.2	2.1	2.1	2.3	2.4	2.5
Purpose / Role in Thesis	Strategic levers of defensibility across layers	Typology to differentiate entry logic & roles	Structural mapping of AI ecosystem; used to locate CP relevance	Interpretive axis for influence depth; used in coding of ecosystem position	Analyze how ventures adapt and reconfigure CPs	Explain how funding logic affects access to CPs and shapes strategic positioning

Note: Some constructs (e.g. Dynamic Capabilities, Core vs. Peripheral) were not directly addressed in the interview guide but used as analytical categories during interpretation.

This matrix served two purposes: first, it was used to generate open-ended interview prompts and second, it provided a consistent conceptual basis for the later coding and interpretation of interview data. Some constructs, such as dynamic capabilities and ecosystem centrality (core versus periphery), were not addressed directly through dedicated interview questions but were incorporated interpretively during coding and analysis. Their inclusion was based on theoretical alignment and recurring patterns within expert responses.

Rather than imposing these constructs as fixed categories, they were used as sensitizing concepts, guiding but flexible lenses through which themes could emerge. During the interviews, prompts were adapted to fit each expert's role and experience, allowing for depth and relevance.

Interviewees were first encouraged to reflect on strategic control in general terms, discussing how different types of CPs manifest across and between layers of the AI value chain. This open exploration was intended to surface unstructured reasoning and ecosystem-level perspectives. In some cases, participants were then invited to ground these abstract reflections by referring to specific portfolio companies or illustrative ventures. In these cases, they mapped the CPs onto the corresponding layers of the AI value chain, based on the underlying business models of the ventures discussed.

3.3 Data Analysis and Framework Development

The interview data were analysed using a structured inductive coding process. This approach allows for the development of conceptually rich, data-grounded categories by iteratively moving from raw empirical material to higher-level theoretical constructs (Gioia, 2013). Transcriptions were generated using Apple's built-in Voice Memos transcription feature and the Notta transcription tool. Data aggregation and structuring during the coding process were conducted in Microsoft Excel.

Some constructs included in the concept matrix, such as ecosystem centrality (core versus periphery), dynamic capabilities, and defensibility, were not always raised explicitly during the interviews. Instead, these concepts were interpreted during the analysis based on patterns in the data. For instance, firms such as NVIDIA were classified as “core” actors due to their infrastructural role, scale advantages, and recurring presence across value chain layers. Similarly, the sensing-seizing-transforming framework from dynamic capabilities theory was used to interpret how companies identified opportunities, mobilised resources, and adapted business models, even when not directly articulated by participants. These interpretations were grounded in the empirical material but structured through abductive reasoning and aligned with the sensitizing concepts from the theoretical framework.

In total, the raw data comprised approximately 90 pages of interview transcripts. These were reviewed line by line, resulting in 280 individual entries in an Excel-based coding sheet. Each entry represented a thematically distinct segment of the interview material and was assigned a first-order code, which served as a thematic label derived from both the empirical statements and relevant literature. These codes were then grouped into predefined second-order themes and interpreted considering the theoretical constructs discussed in Chapter 2 and elaborated in the Concept Matrix. These second-order themes are *Content, Modularity, Digital Infrastructure, Data, Scalability, Unique Solution, Orchestration, Networking, Customer Access, Brand, Know-How, Agility, Financial Resources.* The categories of CPs are *technical control points, strategic control points, generic control points, and institutional boundaries*, outlined by Bohnsack et al., (2024).

For the validation of control point categories and their assignment to layers and actor types, both the frequency and consistency of statements across interviews were considered. Weight

was given to CPs that were independently raised by multiple interviewees or described in relation to comparable strategic logics. The resulting data structure, developed in accordance with the Gioia methodology, is presented in Figure 3. This framework was used to analyse patterns of control across actors and layers, and to assess how certain constellations of CPs influence strategic positioning and defensibility within the AI ecosystem.

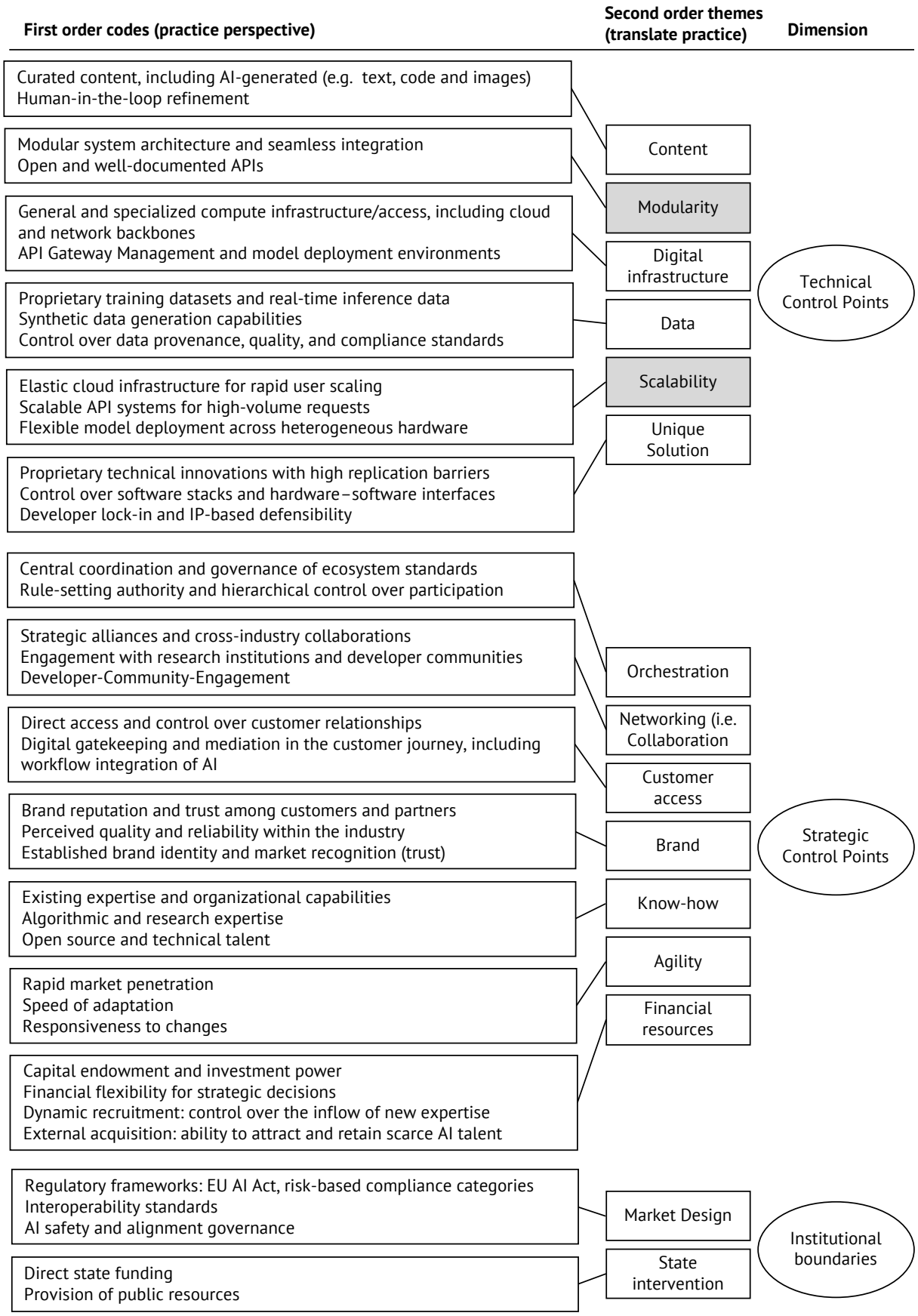

Figure 2. Data Structure

Note: Generic control points are highlighted in light grey

In the interviews, participants were asked to identify which types of CPs are most relevant for specific strategic actor roles across the layers of the AI value chain. The framework distinguishes seven layers, ranging from *infrastructure and cloud platforms to data training, foundation models, MLOps, applications, and service* integration shown in Figure 4. Actor roles were categorized as *AI Giants, AI Enablers, AI Creators, and AI Integrators or Traders.* Additionally, respondents were encouraged to indicate whether a given actor operates at the core or periphery of the ecosystem in relation to specific CPs.

In a subsequent step, some participants were invited to apply the same logic to concrete portfolio companies. These startup-level mappings were used to further validate the analytical framework and connect abstract control logics to real-world business models.

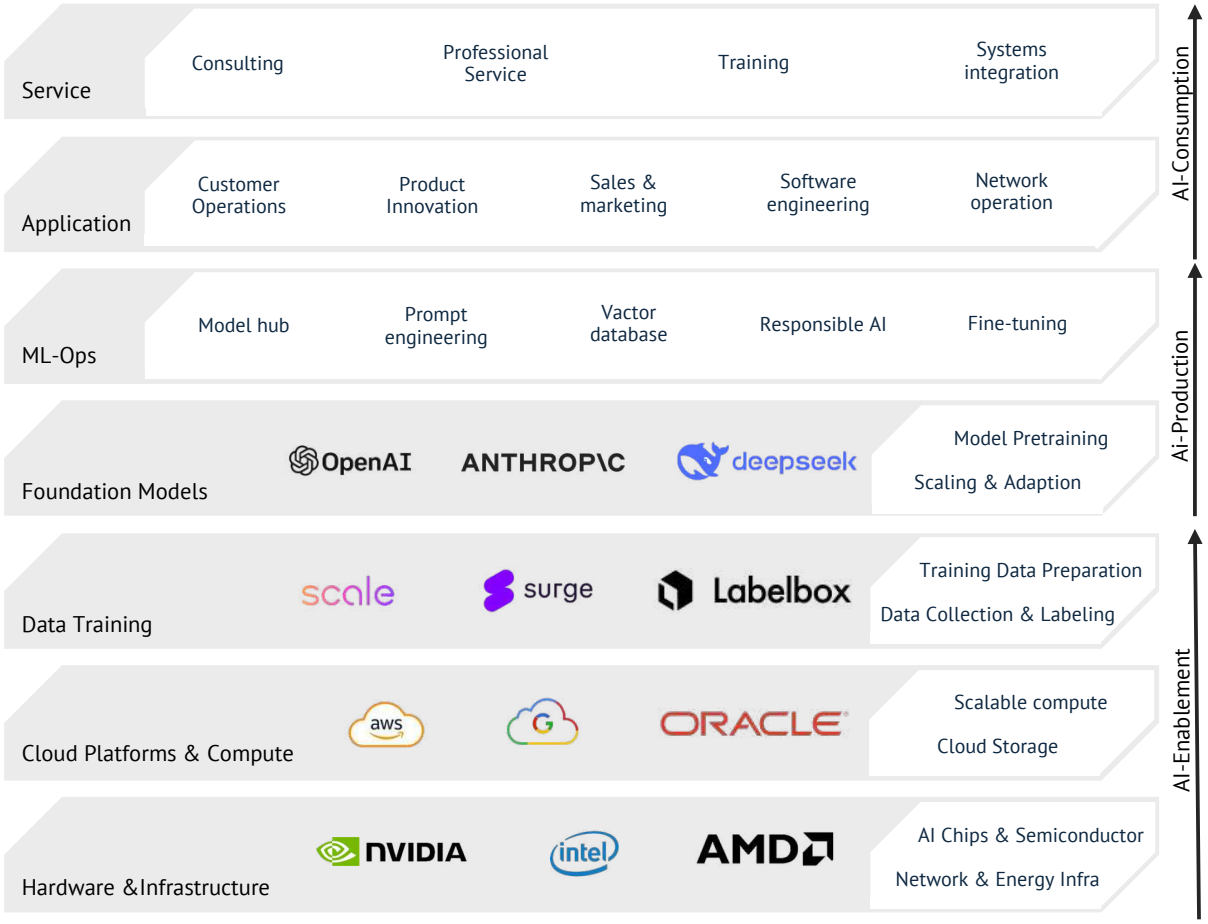

Figure 3. Intuitive Framework (AI-Value Layer)

The analytical approach outlined provided the foundation for identifying and structuring strategic CPs across the layered AI ecosystem. Based on this analysis, a practical four-step framework was subsequently derived to support AI ventures in navigating and configuring defensibility across layers. This framework links actor roles, CP types, and value chain layers

to reveal how different players are positioned and how they build defensibility. It is introduced and elaborated in Chapter 5. The following chapter presents the key findings that informed its development.

4. Results

To identify the control points that emerged as strategically relevant in the AI ecosystem, this section builds on the categories introduced in Chapter 2 and refines them through empirical findings. Based on expert interviews, several CPs were specified in greater detail, expanded with AI-specific characteristics, or emphasized as particularly salient.

4.1 Identification and Classification of Control Points

The following summaries highlight these CPs and how they materialize in real-world contexts. An overview of the underlying coding structure can be found in Appendix Table A1.

Technical Control Points: Interviewees consistently emphasized technical CPs such as data access, compute infrastructure, and scalability as critical enablers of AI development. Data was seen as foundational for training and fine-tuning models, especially in supervised and reinforcement learning settings (e.g., F24, I11). Specialized compute access, particularly GPUs, was described as a structural bottleneck that limited deployment options and increased dependency on a few suppliers (e.g., D46, D49). While modularity and scalability were frequently cited, they were framed more as enabling technical conditions than as standalone moats (e.g., F17, F12).

- **Content** was mentioned in relation to visualization, fairness reporting, and turning model outputs into recommendations (e.g., D3, B39). However, it was not seen as a strong or defensible CP (e.g., C7, A34).

- **Modularity** was described as important for enabling the integration of AI systems into existing tools and workflows (e.g., B27, B28). Interviewees highlighted flexible deployment across different use cases, simple model replacement, and compatibility with tools like Slack or Zendesk (e.g., A21, F17). For users and application providers,

modularity was seen as a practical advantage, especially when switching backend models or offering multiple output types (e.g., A20, A29).

- **Digital Infrastructure** was described as a critical technical control point due to the high cost and limited availability of GPUs. “Access to GPUs is decisive. Everything starts with compute. And if compute is expensive, then everything is expensive” (Founder D46). Interviewees emphasized that compute access plays a central role in enabling large-scale AI operations and that access constraints shape how systems are deployed or scaled (e.g., D47, D49). These infrastructural constraints were repeatedly framed as structural bottlenecks that limit scalability and increase dependency on dominant hardware and cloud providers.

- **Data** was consistently described as a key CP for training and improving AI models (e.g., A16, F25, D33). “Access to customer and industry data is your moat at the end of the day” (C2). Interviewees highlighted both quantity and specificity of data as critical factors, particularly for supervised and reinforcement learning (e.g., F24, I11, D6). The ability to access domain-specific or proprietary datasets was seen as central to enabling high-performance use cases (e.g., C2, F2, F21).

- **Scalability** was frequently mentioned as a critical technical CP, especially in relation to infrastructure, user growth, and cost efficiency (e.g., A32, B16, C11). Participants emphasized the need for AI systems to handle rapid increases in demand, often citing flexible deployment across CPUs, GPUs, and TPUs (e.g., D26, E6). Cloud providers were described as key enablers of scalable architectures, with scalability seen as a prerequisite for stability, global reach, and commercial viability (e.g., B30, F12, C24).

- **Unique Solution** was described as a CP rooted in the ability to develop specialized, often fine-tuned models tailored to specific domains or problems. “The system prompt [is] incredibly important […] the system prompt is the moat” (D59). Interviewees highlighted proprietary prompts, domain-specific adaptations, and fine-tuning strategies as mechanisms to build differentiation (e.g., F52, D59, I15). In several cases, the existence of a proprietary software stack or framework (such as a custom inference

runtime or integration layer) was seen as part of a unique solution, especially when it enabled technical lock-in or simplified adoption for developers (e.g., F4, D51).

Strategic Control Points: Several interviewees referred to strategic factors such as Know-How, Financial Resources, Customer Access, and orchestration capacity as potential sources of long-term defensibility. These factors were often mentioned in combination, rather than in isolation. In particular, the ability to coordinate across different ecosystem actors (e.g., through Orchestration or Networking) and to maintain agility in a fast-moving field was seen to sustain control over time (e.g., D27, F19, C18, A17)

- **Orchestration** was mentioned in the context of routing, deployment, and abstraction across AI components. Some interviewees described orchestration as a structural layer that enables flexible resource allocation or dynamic API selection (e.g., D10, D21, C23). Others emphasized that while open APIs and standards support adoption, they can also limit defensibility if access is broadly available (e.g., F18, D58). Overall, orchestration was viewed as an operational enabler rather than a strong CP, though certain configurations such as meta-routing platforms were seen as potential leverage points (e.g., E3, C18).

- **Networking** was described as a CP emerging from symbiotic relationships between different actors across the AI value chain. Interviewees pointed to reinforcing dynamics between foundational model providers and vertical application developers, often enabled by shared incentives and integration (e.g., D8, D39, D27). Some emphasized the structural role of open standards and developer communities, which promote adoption but may also reduce defensibility (e.g., D9).

- **Customer Access** was described as a widely held but strategically significant CP. "...a simple UI is the most important thing [...] an easy solution [...] that anyone can use [...] even if it's an 80-year-old radiologist" (F54). Several interviewees mentioned tactics such as user incentives, credits, and strong customer support to generate lock-in effects and reduce switching (e.g., D14, D62). Ease of use and seamless adoption were also framed as key enablers of user access (e.g., F54).

- **Brand** was discussed as a supportive but sometimes secondary CP. While several interviewees noted the role of branding and reputation in increasing user trust and visibility, particularly in comparison to lesser-known providers (e.g., C13, C32), others described it as less decisive, especially in foundational infrastructure contexts (e.g., A12, A33). Brand effects were seen as more relevant when targeting end users or building long-term engagement (e.g., C6, C5).

- **Know-How** was frequently described as a foundational CP related to talent, algorithmic expertise, and applied research capabilities. Interviewees emphasized the importance of attracting and retaining top technical talent as a source of differentiation (e.g., A17, F49). In several cases, control over inference-time techniques and heuristics was mentioned as a source of technical defensibility (e.g., D37, D56). The ability to build and sustain internal knowledge was seen as a critical prerequisite for competitive advantage across the AI stack (e.g., A18, C16).

- **Agility** was frequently mentioned for fast-moving players in dynamic environments. Interviewees highlighted that the ability to quickly adapt to new models, standards, or customer needs was often critical for survival and differentiation (e.g., F19, A11, C27). Agility was associated with infrastructure flexibility, organizational responsiveness, and the speed of execution (e.g., C4, F38). As one participant explained: "Agility and innovation are a […] competitive edge […] leading point for startups" (A10).

- **Financial Resources** were consistently described as a fundamental CP due to the high capital requirements associated with developing, training, and scaling AI systems. "...several billions in funding [...] enormous amounts of data [...] enormous compute power [...] otherwise it's all pointless" (F41). Interviewees emphasized that access to funding determines the ability to acquire compute, run large-scale data labelling operations, and compete in infrastructure-heavy segments (e.g., F27, D43). Several participants noted that deep financial reserves, stock market access, or institutional backing enable some players to outspend or acquire others, reinforcing their strategic position (e.g., C19, C9, C15).

Institutional boundaries were described as structural conditions influencing how ecosystem participants operate. Interviewees pointed to regulation, public funding, and geopolitical considerations as increasingly important factors in shaping access and advantage in AI markets. References included state-backed subsidies, regulatory disparities between regions, and national efforts to build technological sovereignty (e.g., C26, B17, F13).

- **Market design** was discussed as a CP shaped by regulatory environments and geographic policy differences. Interviewees noted that legal requirements and compliance standards, particularly in sensitive domains like healthcare, can affect which actors are allowed to operate and scale (e.g., F3). Several participants emphasized that more permissive regulatory frameworks in the US create structural advantages over more restrictive environments in Europe, potentially limiting competition (e.g., F13, F16).

- **State intervention** was mentioned as a structural factor shaping competitive conditions. Several interviewees referred to substantial public funding, infrastructure support, and direct partnerships with government institutions as mechanisms that can strongly influence company trajectories. Such interventions were described as contributing to market entry advantages, resource access, and early-stage momentum (e.g., C26, B17, B21, B12).

4.2 Mapping Control Points Across Layers and Actor Types

To analyse how control points manifest within the AI ecosystem, control types were positioned along two analytical dimensions: the AI value chain, based on seven technical layers, and strategic actor types (AI Giants, Enablers, Creators, Integrators/Traders). This mapping reveals distinct configurations of influence, capability, and dependency, based on where actors operate and which CPs they leverage. The resulting framework illustrates how and where control is concentrated, as shown in Figure 4:

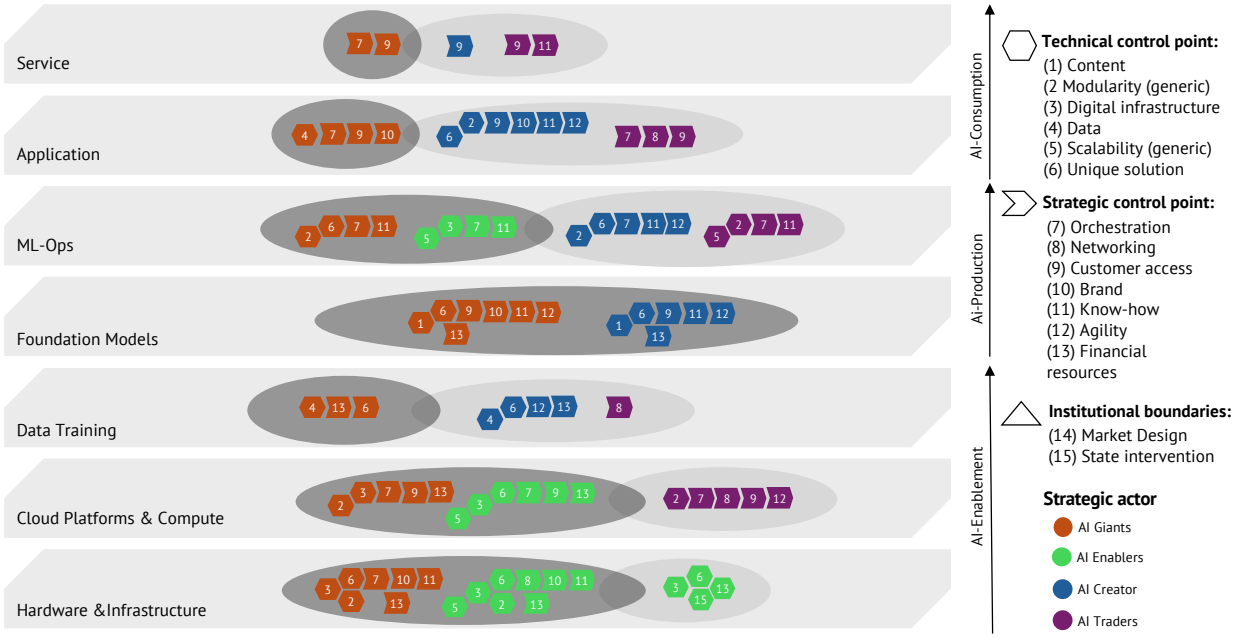

Figure 4. Control Point Framework for Strategic Actor Groups

The Infrastructure Layer:

The infrastructure layer represents the foundational level for all digital AI operations. Across interviews, this layer was associated with a particularly high concentration of CPs, especially for AI Giants and Enablers.

AI Giants were primarily linked to control through *Financial Resources*, enabling them to build large-scale compute infrastructure and develop proprietary chips (e.g., A26, F41, D43). AI Giants were also frequently associated with control over *Specialized Compute Infrastructure* (e.g., D46, F42), often resulting in technical lock-in. In addition, they were linked to *Orchestration* (e.g., A31, C23), enabling them to coordinate resources across internal and external layers. Other relevant CPs included *Unique Solution* (F45, D50), *Brand* (e.g., A23, D41), *Technical Know-How* (e.g., A27, I17), and *Modularity* (e.g., A29).

AI Enablers were consistently linked to the technical backbone of the infrastructure layer. Interviewees pointed to a *Unique Solution* such as chip architectures and ecosystem-specific stacks as central CPs (e.g., F43, D48). Enablers were also seen as holders of deep hardware-related *Know-How*, such as chip design or optimization (e.g., C21, I14, B19). Access to specialized *Digital Infrastructure*, especially GPUs, was repeatedly mentioned as both a technical and strategic bottleneck (e.g., D46, D49). Enablers also rely on significant *Financial Resources* to build and scale physical infrastructure (e.g., E5, C19, B18). Interviewees further

referenced *Networking* via OEM contracts, strategic partnerships, or standard setting (e.g., A30, D44, D45), as well as *Scalability* (e.g., C24, A32), *Modularity* (e.g., A29), and *Brand* (e.g., A23). **Peripheral Enablers**, such as specialized hardware startups, were linked to *Unique Solution*, state support through *State Intervention*, and emerging efforts to build open or *alternative Infrastructure* (e.g., D53, I15).

Cloud Platform & Compute:

The cloud layer provides on-demand computing platforms (IaaS/PaaS) that scale AI workloads globally. It is the backbone for AI development and deployment, dominated by hyperscale platforms.

AI Giants dominate through access to global *Digital Infrastructure* such as GPU clusters and data canters (e.g., D17, F7), backed by substantial *Financial Resources* enabling global coverage (e.g., C9, A8). Their *Customer Access* control is reinforced by pricing strategies and onboarding incentives like developer credits (e.g., D14, A7). Giants also hold control via *Unique Solution* (e.g., D22, F8). AI Giants further rely *on Orchestration* capabilities to coordinate cloud services across layers and deploy flexible architectures using *Modularity* (e.g., D21).

AI Enablers connect through deep technical integration. Their control is based on *Unique Solution* (e.g., C12, F10, I8). They rely on access to *Digital Infrastructure* for training and inference workloads (e.g., A9, D19) and require high *Financial Resources* to scale compute offerings (e.g., B14, D18). AI Enablers emphasize *Scalability*, enabling dynamic resource allocation for compute-intensive tasks (e.g., B16), and manage complex environments through *Orchestration* (e.g., D21). Some rely on *Customer Access* through software dependencies (e.g., I8).

AI Integrators play a coordination role. Their control emerges through *Orchestration* of multi-cloud offerings (e.g., D21), along with *Modularity* to abstract different providers (e.g., A7). They use *Networking* via partnerships and reseller programs (e.g., B15, D20), and differentiate through managed *Customer Access* (e.g., A7). To remain competitive, they require high *Agility* in adopting and reselling new services (e.g., C4).

Data Training:

The Data Training Layer encompasses the acquisition, preparation, and structuring of datasets required for training AI models. Interview data highlights that this layer is defined by resource intensity, data exclusivity, and technical innovation in data processing.

AI Giants were repeatedly associated with data dominance, particularly regarding internal platform *Data* and access to massive volumes of user interaction logs (e.g., F20, F25). This creates an enduring structural advantage over smaller actors. Several interviewees highlighted data monopolization, describing how proprietary datasets act as a critical lock-in mechanism (e.g., F21, D30, D64). *Financial Resources* were emphasized as a requirement to operate in this layer (e.g., F27, D64). *Unique Solution* related to data handling was also mentioned. This includes long-context data management and infrastructure optimization that reduce manual labelling and improve throughput (e.g., D31, F28).

AI Creators were strongly linked to domain-specific *datasets*, allowing them to fine-tune models for specialized use cases (e.g., F24, F29). AI Creators also explore *Unique Solution* in data efficiency, including semi-automated labelling or embedding-based retrieval workflows (e.g., F28, F29). They were connected to challenges related to *Financial Resources*, especially when dealing with labelling-intensive projects or sourcing proprietary datasets (e.g., F27). *Agilit*y was observed as a comparative advantage, with smaller players capable of rapidly re-labelling, adjusting pipelines, or experimenting with new data strategies in response to feedback or shifts in model performance (e.g., D31, F29).

For AI Integrators, *Networking* emerged as the key CP in the Data Training Layer. While they rarely build datasets themselves, they frequently act as intermediaries, brokering access, facilitating integration, or partnering with data providers (e.g., D28).

Foundational Models:

The Foundational Model Layer represents a critical leverage point in the AI ecosystem, where technical assets, research capabilities, and Financial Resources converge. Across interviews, this layer was consistently described as one of the most control-heavy, particularly for AI Giants, due to the capital intensity and technological complexity involved in developing and maintaining large-scale language models.

AI Giants were associated with a wide range of strategically and technically significant CPs in the foundational model space. *Content*, particularly in the form of proprietary model weights and fine-tuned architectures, was highlighted as a core asset (e.g., A13, B4, F30). These models serve as the backbone for a broad API and application ecosystem, driving wide adoption (e.g., D32). AI Giants also benefit from deep integration of *Customer Access* through ecosystem services and default distribution channels (e.g., H7, B36). *Brand* was named as a trust-building mechanism, especially for end-users who select models based on perceived quality and reputation (e.g., B4, D39). In addition, *Unique Solution* was linked to differentiating leadership in the foundational model race (e.g., F40, D40, D67). Control through *Financial Resources* was frequently emphasized. Closely related was *Know-How*, especially in algorithm development, research team building, and scaling complex training infrastructure (e.g., D37, D38, F37). *Agility* was also cited repeatedly, as foundational models require fast adaptation to changing research breakthroughs and infrastructure standards (e.g., F39, A11).

AI Creators were most closely associated with *Unique Solution* in niche verticals, where domain-specific adaptation or prompt optimization could offer performance differentiation (e.g., A13, D40, F40). *Know-How* was central for creators, particularly in designing innovative prompt strategies, training workflows, or model interfaces (e.g., A18, C16, D35). In addition, the importance of *Financial Resources* was repeatedly mentioned, especially for building data pipelines, acquiring *Compute Access,* or running user experiments (e.g., C15, F35). *Agility* was mentioned across multiple interviews as a required trait, enabling startups to quickly adopt new research, fine-tune open-source models, or shift between architectural options (e.g., A10, F38). This was described as essential to maintain relevance and avoid being locked out by shifting model standards. AI Creators also emphasized *Customer Access*, particularly in vertical contexts where credibility and usability drive adoption (e.g., H8, A15).

Machine Learning Operations (MLOps):

The MLOps layer plays a critical role in bridging model development with deployment, monitoring, and continuous improvement. CPs distribution reflects varying degrees of *Infrastructural Orchestration, Modular Design, and Strategic Agility* required to ensure competitive, scalable AI operations.

AI Giants were strongly associated with *Orchestration* capabilities (e.g., H9, D57). These Orchestration capabilities allow Giants to exert control over both technical flow and ecosystem logic. Giants also frequently deploy *Modular* deployment stacks, enabling seamless updates without service interruption (e.g., B28). They leverage *Unique Solution* for deployment and inference, including custom runtime environments, proprietary adapters and fine-tuning frameworks tailored to specific industries (e.g., A37, D61, F52). These *Modular* components allow for targeted adaptation of foundation models without full retraining. *Know-How* emerged as a central CP as well, particularly in the areas of inference-time optimization, MLOps architecture, and internal engineering standards (e.g., D56, F49).

AI Enablers were consistently tied to the technical enablement of MLOps at scale. Interviewees highlighted their *Orchestration* capabilities for model infrastructure and development pipelines (e.g., H10). Enablers supply the *Digital Infrastructure* needed for advanced inference and fine-tuning, often through proprietary toolchains or deployment kits (e.g., B24). Their strength in *Scalability* was another prominent theme. Respondents mentioned that Enablers design systems capable of auto-scaling based on customer workloads, especially in enterprise settings (e.g., E6, B31). As with Giants, *Know-How*, especially around MLOps tool development and pipeline optimization, was viewed as an essential advantage (D56, F49).

AI Creators were linked to a broader, more dynamic spectrum of CPs. A prominent theme was strategic *Agility*, the ability to adapt tooling and deployment practices rapidly, often in response to new foundation models or shifting user needs (e.g., C27, F50). AI Creators build and control their own *Orchestration* pipelines to manage internal experimentation and deployment (e.g., H11) and increasingly rely on *Modular* adapters for fast, targeted fine-tuning (e.g., B27, F52). Interviewees repeatedly emphasized *Unique Solution* as a source of differentiation, ranging from explainability techniques (e.g., B35) to proprietary system prompts (e.g., D59), inference-time heuristics (e.g., D56), and domain-specific AutoML pipelines (e.g., F51). Control over *Know-How*, particularly in continuous learning, model versioning, and deployment architecture, was also stressed (e.g., F49, A36).

AI Integrators leverage customer access to create full-stack solutions, often combining multiple models into coherent service offerings. This market proximity allows them to *Orchestrate* models tailored to end-user needs (e.g., G1, D55). Several interviewees

emphasized that Integrators use *Modular* deployment frameworks to ensure compatibility with existing customer IT environments (e.g., B25). *Scalability* and *Orchestration* were also frequently mentioned. Integrators must coordinate inference workloads and model interactions without affecting service continuity (e.g., B31, E6). Like other actors, *Know-How* in deployment monitoring and lifecycle management was seen as essential (e.g., B26, C30).

Application Layer:

The Application Layer marks the primary interface between AI systems and end users. CPs at this level focus on user access, interface integration, domain-specific adaptation, and platform embedding. Interviews revealed that this layer is shaped by competition over visibility, usability, and lock-in effects. Across actor groups, control is often asserted through *Brand strength, Customer Access, Modular architecture, and Orchestration.*

AI Giants were consistently associated with dominant *Brand* presence and *Customer Access* (e.g., H3, F1). AI Giants also deploy *Orchestration* strategies to integrate multiple AI applications into seamless platform ecosystems, maximizing user retention (e.g., H5, D10). Another recurring theme was the use of user feedback and *Interaction Data* to continuously improve application performance and personalize experiences (e.g., H6, D62). Giants are thus positioned to build self-reinforcing feedback loops through volume-based usage.

AI Creators use a mix of *Modularity*, *Customer Access*, and *Agility* to differentiate themselves in niche markets. *Modularity* was tied to flexible API-based architectures that allow creators to offer customizable vertical solutions (e.g., D10, I7). These structures help reduce integration friction and enable ecosystem effects through open interfaces. Several respondents noted that *Customer Access* is vital for vertical SaaS offerings, where direct relationships with end-users are key to adoption and feedback loops (e.g., D4, A3). *Brand and Reputation* were also frequently cited as CPs, particularly in regulated or trust-sensitive verticals (e.g., D1, B1). AI Creators were strongly linked to *Agility*, with interviewees emphasizing the need to rapidly adapt applications to changing foundation models or user expectations (e.g., F4, I2). *Know-How* and *Unique Solution* were also seen as critical in translating base model capabilities into end-user value (e.g., D11, D7).

AI Integrators hold control primarily through *Customer Access* and *Orchestration* (e.g., H2, E1). AI Integrators act as system-level enablers, embedding AI into enterprise environments through their *Orchestration* capabilities (e.g., E3, G1). *Networking* was also referenced, particularly in terms of integrations with existing enterprise stacks that help secure stickiness and multi-model *Orchestration* (e.g., H1, D8). These connections help integrators maintain relevance even without proprietary models or algorithms.

Service Layer

The Service Layer focuses on activities at the interface between AI systems and enterprise customers. Interviews highlighted that control at this level is primarily built through trust-based customer relationships, deep domain expertise, and control over integration pathways.

AI Giants assert control in the Service Layer through *Orchestration* of surrounding systems and the enforcement of technical and contractual standards. Several interviewees referenced the use of centralized service environments that can be rolled out across multiple AI models, allowing seamless *Orchestration* at scale (e.g., B37). In addition, *Customer Access* was frequently associated with account-management infrastructure and long-term platform embedding through ecosystem-based lock-in strategies (e.g., B36).

AI Creators rely on *Customer Access* to offer differentiated services such as fine-tuning, performance optimization, and post-deployment maintenance. Interviewees noted that service-based offerings require ongoing interaction with customers, making user proximity a key CP (e.g., B36). This includes the ability to respond to evolving needs, manage performance expectations, and offer vertical customization.

AI Integrators were strongly associated with *Customer Access* and *Know-How* (e.g., B36, C31). Several emphasized that *Know-How* is the primary asset at this level (e.g., C34). While *Brand* was occasionally noted as a supporting factor, respondents clearly framed it as secondary to reputation and trust in service relationships (e.g., C32).

4.3 Application to AI Startups

To further validate the identified CPs, a real-world application was conducted by mapping actual AI startups. During the interviews, venture capitalists were asked to reflect on portfolio companies or ecosystem startups and describe which CPs these firms possess across the AI

value chain. The resulting cases offer grounded insights into how emerging companies establish control in practice and across layers. The accompanying Figure 5 illustrates the CP positioning of each startup across the AI value chain.

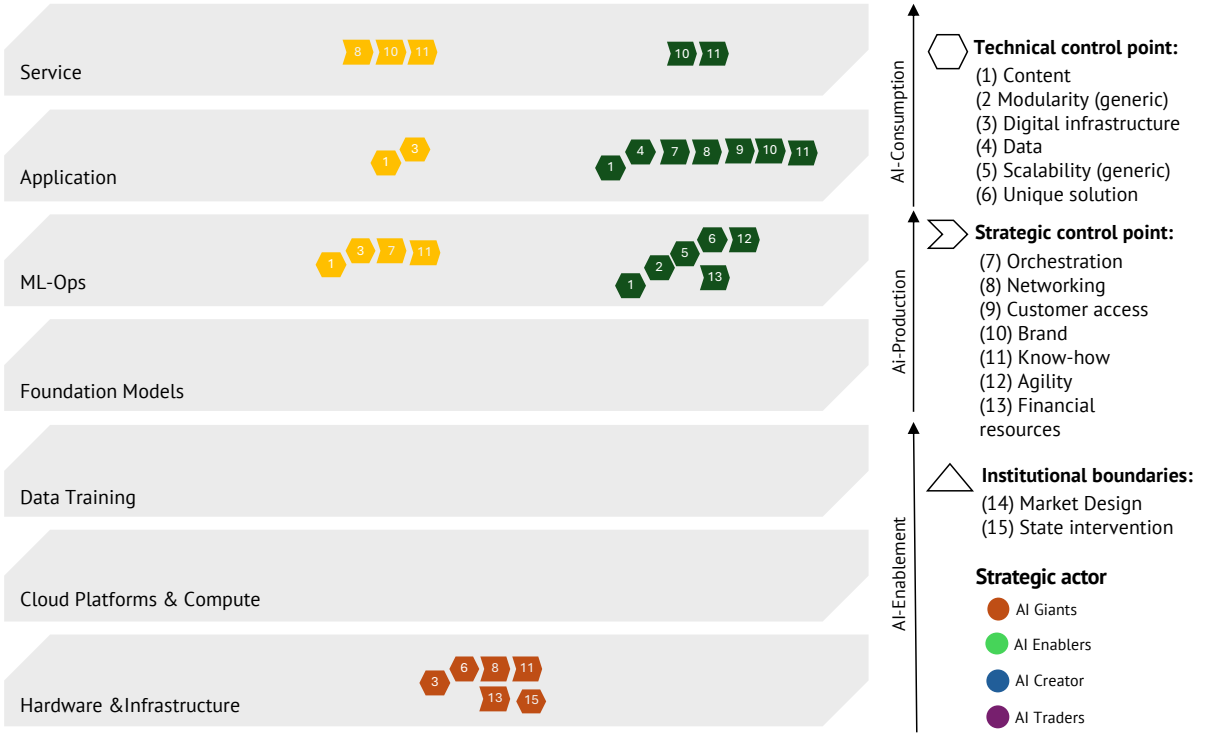

Figure 5. Control Point Framework: Startup Case

Case 1: AI Agent Solution for Customer Support Automation (AI Integrator)

The first startup delivers an AI agent that automates customer support by integrating directly into existing enterprise platforms such as Slack, Zendesk, and email. The solution enables fast deployment and seamless use within days, transforming customer interactions into actionable recommendations.

On the **MLops layer,** CPs include *Content,* as the system converts customer inputs into insights (e.g., B22, B9), *Modularity*, since integration requires no IT effort (e.g., B27), and *Scalability*, with the system adapting to fluctuating support volumes automatically (e.g., B31). It also features a *Unique Solution* by minimizing hallucinations (e.g., B34), demonstrates *Agility* through quick onboarding (e.g., B32), and is linked *to Financial Resources* due to fast growth and high burn rate (e.g., B2).

At the **application layer**, it holds control through *Content* (e.g., B22, B9), *Data* from embedded environments like Slack (e.g., B11), and *Orchestration*, as the agent autonomously makes

decisions (e.g., E4). *Networking* is implied through third-party integration (e.g., B27, B25). *Customer Access* is emphasized via full routing of support interactions (e.g., B10), while *Brand* (e.g., B1, B8) and *Know-How* (e.g., B3, B7) are cited as key enablers of market presence and product performance.
Within the **service layer**, *Brand* (e.g., B1, B8) and *Know-How* (e.g., B3, B7) continue to serve as relevant CPs, particularly for implementation and ongoing operation.

Case 2: AI Solution for Model Explainability and Risk Monitoring (AI Integrator)
The second startup offers a platform to assess AI models with respect to fairness, explainability, and compliance, targeting regulated industries. The system integrates into existing infrastructures and supports continuous model monitoring.

In the **MLOps layer**, CPs include *Content,* as it generates detailed fairness and performance reports (e.g., B39), *Digital Infrastructure*, with privacy-preserving design that avoids storing sensitive *Data* (e.g., B24), and *Orchestration*, enabling broad model compatibility and integration (e.g., B37). Interviewees also emphasized *Know-How*, referring to the company's specialized expertise in model explainability and risk evaluation (e.g., B26).
On the **application layer**, the company maintains control through *Content,* translating technical model diagnostics into compliance-relevant outputs (e.g., B39), and *Digital Infrastructure*, validated through secure system integration (e.g., B24).

At the **service layer,** the firm is linked to *Networking,* due to its early presence in relevant ecosystems and standard-setting contexts (e.g., B29). *Know-How* remains central, with expert understanding cited as key to supporting responsible AI practices (e.g., B26, B35). *Brand* was not explicitly mentioned, but can be inferred from its positioning in high-trust environments.

Case 3: Semiconductor Innovator for AI-Centric Compute Infrastructure (AI Enabler)
The third startup focuses on advanced semiconductor technologies to support AI-specific compute needs. Its work targets improvements in processing efficiency and infrastructure performance.

In the **infrastructure layer**, core CPs include *Digital Infrastructure*, as the company builds hardware for AI-scale operations. A *Unique Solution* is evidenced by the repeated reference to

its technological edge and “extreme head-start” (e.g., B14, B18). Interviewees also highlighted strong *Know-How* in chip design and architecture (e.g., B19, B20) and noted the company’s *Networking* within expert communities (B15). *Financial Resources* were repeatedly emphasized, including private capital and large-scale public investment (e.g., B14, B18, E5). *State Intervention* was identified as a distinct factor, with significant government grants supporting the company’s development and strategic positioning (e.g., B17, B21).

5. Discussion and Framework Refinement

This chapter builds on the empirical findings presented in Chapter 4 to examine how AI ventures can achieve sustainable competitive advantage. It focuses on how control points are orchestrated across different layers of the AI ecosystem to create and defend strategic positions. Rather than presenting CPs as a static list of strategic assets, this chapter frames them as instruments of competitive positioning. Their strategic value emerges from how they are configured and applied within an AI ecosystem composed of interdependent technological layers. These layers differ in their associated capabilities, actor types, and control dynamics, and are marked by unequal access to key resources. Strategic control in digital ecosystems has been theorized in multiple ways, particularly in the context of platforms, modular architectures, and ecosystem governance.

5.1 From Description to Interpretation: Strategic Meaning of Control Points

From a theoretical perspective, this discussion extends platform and ecosystem literature with a layered, actor-specific view of defensibility. Practically, it offers founders and investors a lens to evaluate the robustness of competitive positions in dynamic AI markets. While Control Points have been defined as sources of strategic advantage, their actual defensibility depends on how they are embedded and configured across the AI stack. Their strategic power emerges when they enable lock-in, drive differentiation, or allow an actor to coordinate other participants’ activities within the broader ecosystem. Technical Control Points, such as Digital Infrastructure or Data, often serve as foundational enablers. Their strategic relevance becomes apparent only when considered in relation to ecosystem context, actor roles, and complementary capabilities. For instance, digital infrastructure, especially access to specialized compute, is not only a technical necessity but also a structural bottleneck that determines which actors can effectively train or host foundation models.

Data was repeatedly described as a critical resource, yet its defensibility depends on more than volume. Interviewees differentiated between generic data volume and domain-specific precision, the latter being essential for vertical applications. Specialized use cases, such as medical AI, require highly specific datasets that are difficult to replicate.

Unique Solution was also discussed as CPs, though their durability was questioned. Interviewees noted that many models are built on similar architectures, making differentiation difficult. This view aligns with the idea that technical CPs gain strategic traction only when they are embedded in broader patterns of system design, customer integration, or ecosystem positioning and when supported by Agility, enabling ventures to continuously adapt and refine Unique Solution in response to shifting standards and user demands. Notably, the perceived value of uniqueness differed across layers: while it implied deep technical invention in lower layers like infrastructure or foundation models, it was more about use-case innovation and problem framing in higher layers.

Financial Resources also emerged as a foundational CP not only enabling access to infrastructure or compute but often serving as a basic prerequisite for participating in key layers of the AI ecosystem. Without sufficient capital, entry into areas like model training, cloud provision, or data scaling is structurally blocked.

In summary, CPs achieve strategic relevance when they move beyond their technical nature and are embedded into relational, architectural, and temporal configurations. This interpretation supports a more dynamic view of CPs as instruments of positioning within the evolving AI ecosystem.

5.2 Application of the Layered Control Point Framework

Building on the empirical findings presented in Chapter 4, this section introduces a strategic framework that structures how AI ventures can develop defensibility through the configuration of Control Points. The framework integrates the identified mechanisms into a sequential process that reflects how startups navigate the layered architecture of the AI ecosystem.

The resulting model consists of four interconnected steps that guide ventures from initial assessment to ongoing strategic adaptation. An overview of the framework is provided in Figure 7.

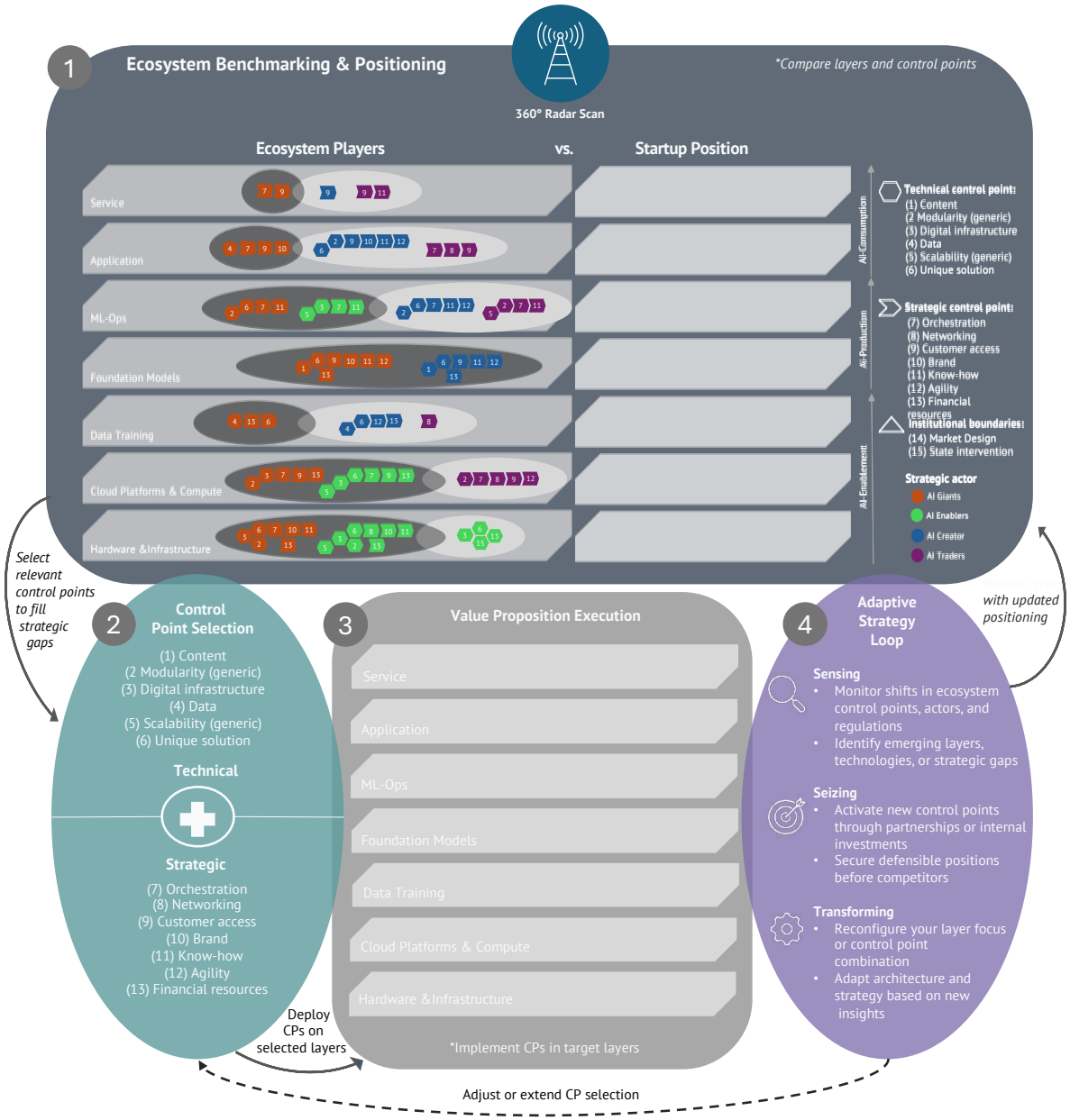

Figure 6. Four-Step Framework for Building Defensibility through Layered Control Points

Step 1: Ecosystem Benchmarking and Positioning requires startups to assess their current place within the AI stack and benchmark themselves against relevant ecosystem actors. This includes identifying which technological layers they operate on, the role they play (e.g., creator, integrator), and the core elements of their current value proposition. Internal positioning alone is not sufficient. Especially for ventures operating in application-heavy or vertical domains such as AI consumers, strategic defensibility depends on understanding the broader ecosystem context.

A key element of this step is conducting a 360-degree Control Point Radar Scan, which broadens the assessment beyond the startup itself. This involves four complementary perspectives:

1. Vertical focus: Mapping the Control Points of players in the relevant industry or ecosystem to understand where defensibility may emerge, be lost, or already be dominated.
2. AI giants focus: Assessing how dominant platforms might integrate or neutralize the startup's value proposition by replicating features or strengthening ecosystem lock-in.
3. Diversifying entrants focus: Analysing actors from adjacent industries who attempt to open or compete in the same vertical and claim relevant CPs.
4. Institutional focus: Evaluating how regulation, public funding, and policy frameworks shape access, legitimacy, and competitive dynamics in specific regions or sectors.

By combining internal positioning with this external radar scan, startups can identify both opportunities for differentiation and potential threats to long-term defensibility. This broader awareness helps inform strategic choices before committing to a particular direction and encourages founders to treat defensibility as a dynamic, context-dependent challenge.

Step 2: Control Point Selection involves identifying which CPs are realistically within reach and assessing their potential to create defensible positions. Startups consider whether these CPs are technical, strategic, or regulatory in nature and how well they align with the layers they intend to operate in. Rather than focusing on isolated assets, ventures evaluate combinations that strengthen their positioning. This step also includes prioritizing which CPs to build or reinforce in line with long-term strategic objectives.

Step 3: Execution focuses on translating selected CPs into tangible product and process decisions. The framework supports mapping these actions across relevant AI layers, linking each CPs to user impact and market outcomes. Strategic intent is made operational through clear execution pathways that reinforce the startup’s position within the ecosystem.

Step 4: Adaptive Strategy Loop emphasizes ongoing responsiveness. Startups monitor ecosystem signals and internal feedback to identify risks and opportunities, respond through timely action, and adjust their CP configuration or stack position accordingly. This dynamic cycle of sensing, seizing, and transforming leads back to reassessment, encouraging continuous refinement of strategy as conditions evolve.

To support the practical interpretation of the framework, an illustrative use case is provided in Appendix A. It outlines how a fictional AI Creator operating in the LegalTech domain could apply the framework step by step. While not based on a single empirical case, the example reflects recurring themes from the interviews and demonstrates how CPs can be configured across different layers and refined over time.

Taken together, the framework supports startups in building not only functional AI products, but also resilient competitive positions through smart resource orchestration. By structuring thinking across layers, CP types, and tactical implementation, the model offers a practical roadmap for navigating defensibility in a fast-evolving ecosystem.

5.3 Actor-Specific Strategies for Defensibility

The diversity of actor roles in the AI ecosystem implies varying strategies for building defensibility. This section explores how each actor type uses CPs to sustain its position. The actor types analysed below reflect different strategic roles and entry patterns. Giants are typically diversifying entrants, expanding from existing platform positions. Enablers are often incumbents, though some new entrants operate in peripheral roles. Creators and Integrators are mostly new entrants, building defensibility through specialization or orchestration.

AI Giants operate across multiple layers, integrating foundational models, infrastructure, and applications. Their defensibility stems from combining technical control with strategic CPs such as Brand, Customer Access, and Orchestration power. Interviewees noted that firms like Google gain additional leverage through ecosystem lock-in, such as exclusive cloud access and embedded distribution channels. Their control extends beyond ownership to shaping standards, access pathways, and model defaults.

AI Enablers focus on technical leverage, often through unique infrastructure, compute efficiency, or data tools. These actors, such as chip designers or platform optimizers, build defensibility by excelling in engineering depth. Their CPs include high-performance computing environments, specialized APIs, or proprietary training frameworks. New entrants usually start as peripheral enablers, focusing on narrow technical niches. With Unique Solution, Financial Resources, and Agility-driven Scalability, they can gradually build influence and move toward core Infrastructure positions.

AI Creators develop domain-specific AI applications. They rely heavily on Agility, Know-How, and user proximity. Because they typically do not own foundational models or infrastructure, their defensibility comes from vertical integration, usability, and the ability to adapt quickly. Their CPs often revolve around fine-tuning models, orchestrating workflows, and embedding AI into real-world tasks. Several respondents noted that creators make AI consumable, translating foundational capabilities into customer-facing value.

AI Integrators or traders specialize in embedding AI into enterprise systems. Their defensibility is rooted in customer access, service quality, and integration Know-How. While they may not generate AI themselves, they control the implementation environment. Their CPs include orchestration tools, consulting capacity, and long-term service contracts. In regulated industries or complex systems, these integration capabilities become critical enablers of AI adoption.

5.4 Core vs. Periphery

This study finds a recurring pattern in how AI startups position themselves across the technological layers of the AI ecosystem. Rather than acting freely across the full value chain, startups are structurally constrained by access to capital, infrastructure, data, and partner networks. As a result, they tend to operate either close to the core of the AI architecture on foundational layers such as infrastructure, cloud platforms, and foundation models or on the periphery, in application, MLOps, or service-related layers.

Ventures positioned near the core of the AI ecosystem typically operate in capital-intensive layers such as hardware infrastructure, cloud platforms, or foundation model development. Entry requires access to high-performance compute, proprietary data pipelines, advanced research talent, and often institutional support. Interview data confirms that defensibility in these layers stems from technical and generic control points, including custom model architectures, exclusive datasets, and infrastructure control. Maintaining such positions demands continuous sensing, large-scale resource mobilisation, and adaptation.

In contrast, periphery-oriented positions are concentrated in the upper layers of the AI value chain, particularly in MLOps, application, and service domains. Startups following this strategy do not create foundational technologies but build on existing tools and platforms. Their focus lies in Agility, customer access, domain-specific integration, and orchestration. The control points they employ are primarily strategic and generic, such as Brand, Customer Proximity, and

Modularity. While offering less structural protection, these enable faster market responsiveness. Dynamic capabilities emerge through rapid iteration, feedback loops, and continuous adaptation to evolving user or regulatory demands.

Table 3. Strategic Conditions at Core and Periphery of the AI Layer Landscape

Dimension	Core Strategy	Periphery Strategy
Layer Focus	Infrastructure, Data Layer, Foundation Models	MLOps, Application, and Service Layers
Typical Control Point Categories	Technical and generic CPs (e.g., Unique solution, Data, Digital Infrastructure)	Strategic and institutional CPs (e.g., customer access, Brand, Orchestration)
Defensibility Mechanisms	Scale and resource advantages, technical entry barriers	Lock-in through workflows, data coupling, modularity, regulatory proximity
Risks	Scale and resource advantages, technical entry barriers	Low entry barriers, dependency on upstream layers
Use of Dynamic Capabilities	Transforming at infrastructure level, reconfiguring internal resources	Sensing underutilized CPs, rapid seizing in go-to-market execution

Table 3 compares the two strategic orientations, outlining their typical layer focus, CP categories, defensibility mechanisms, risks, and use of dynamic capabilities. The comparison reinforces the layered logic developed in this thesis and helps startups assess which strategy aligns with their resources, constraints, and ecosystem role.

5.5 Recommendations for AI Startups

The findings offer several strategic implications for early-stage AI ventures aiming to build defensibility. First, startups should align their Control Point strategy with the specific AI layer they operate in. For most, this initially means positioning in the MLOps or application layers, where entry barriers are lower and user proximity allows for faster iteration. These layers primarily reward agility, usability, and niche focus.

Second, defensibility often arises from combinations of CPs rather than individual assets. For instance, a startup may not own unique data but can create defensibility by integrating public models into highly specialized customer workflows. Modularity and Scalability function as

generic enablers but must be linked to real user value to become strategically meaningful. One investor pointed out that inference speed is increasingly a differentiator, especially as model sizes grow. Ventures optimizing for latency and cost can offer clear performance advantages.

Third, partnerships and ecosystem integration are crucial. Many respondents highlighted that CPs can be created indirectly, for example through early partnerships that ensure preferential access to infrastructure or training data. Strategic alliances with cloud providers, industry associations, or complementary ventures can help establish a presence in the ecosystem before technical CPs are fully developed. In this context, dynamic capabilities are essential.

Finally, startups must invest in talent and internal capabilities. Know-How, particularly in model adaptation, prompt engineering, and inference optimization, was repeatedly mentioned as a strategic asset. Unlike physical infrastructure, this form of control is portable and scalable. It also supports agility, allowing firms to navigate evolving research trends and changing user expectations.

5.6 Control Points vs. Moats

Control Points mark strategic levers in the AI value chain but are not automatically equivalent to long-term competitive advantages, or "moats." CPs describe positions or resources that provide influence or bargaining power at a given point in time, such as privileged data access, specialized infrastructure, or orchestration capacity. Moats, by contrast, imply durable and difficult-to-replicate advantages that sustain superior market positions over extended periods.

The case analysis indicates that certain CPs, particularly in Case 1, may at first suggest the potential for longer-term advantages, including various forms of proprietary access, strong customer relationships, and substantial Financial Resources. As Azoulay (2024) emphasizes, the durability of such positions depends on their resistance to technological change and imitation. Some CPs may therefore represent less of a structural defense and more of a temporary bottleneck that weakens once innovation advances or standards emerge.

This perspective is reinforced by Joquino (2025), who argues that while AI lowers barriers to entry and makes it easier to build new products and companies, it simultaneously makes it more difficult to secure lasting defensibility. As he notes: "With AI making it easier to build but harder to defend, founders must master the art of moat-building to survive." The central

challenge thus shifts from merely identifying CPs to effectively transforming them into resilient and enduring moats.

For instance, GPU access may be a strong CP today, but its defensive value diminishes once alternative compute architectures are established. By contrast, integrated data ecosystems or regulatory entry barriers are more likely to translate into genuine moats, as they involve significant replication hurdles.

5.7 Synthesis: Relevance for Research and Practice

This thesis explored how ventures in AI ecosystems build and sustain strategic defensibility by orchestrating CP across layers. The findings show that defensibility emerges not from individual assets, but from the configuration of technical, strategic, generic, and institutional CP aligned with a venture's role and ecosystem position. The developed framework contributes theoretically by extending platform control literature with a layered and actor-specific perspective. Practically, it offers a tool for founders and investors to assess defensibility in dynamic markets. This synthesis bridges Modular System Theory and real-world venture strategy, supporting a more nuanced view of competitive advantage in AI.

5.8 Limitations

This study has several limitations that should be acknowledged. First, the empirical basis relies on nine qualitative interviews and three case studies with a limited number of participants. While this approach provides rich insights into how CPs manifest in practice, it limits the generalizability of the findings. Second, the analysis captures a dynamic field that is subject to rapid technological and regulatory change. CPs identified as relevant today may evolve quickly, reducing the temporal validity of the results. Third, the selection of cases and interviewees may introduce bias, as the perspectives reflect specific ecosystem roles and geographies. Finally, the coding process, while systematic, is interpretive in nature and shaped by the researcher's analytical lens. Future research could address these limitations through longitudinal studies, comparative analyses across regions, or quantitative validation of the framework.

6. Conclusion

This study set out to explore how ventures operating within the AI ecosystem can build and sustain strategic defensibility by orchestrating CPs across distinct layers of the AI value chain. The findings demonstrate that defensibility is not rooted in a single asset or capability, but in the configuration of technical, strategic, generic, and institutional CPs. These points gain strategic relevance when combined and aligned with a venture's ecosystem position and capabilities, particularly in relation to the layered architecture and the distinction between core and peripheral positions. The four-step framework developed in this thesis offers founders a tool to assess, sequence, and adapt their CP strategies across layers and over time.

The research contributes theoretically by advancing a layered and modular framework for analysing control in AI ecosystems. It builds on existing ecosystem and platform literature by offering a fine-grained typology of CPs and linking them to specific actor roles, such as AI Giants, Enablers, Creators, and Integrators. Ecosystem centrality, particularly the distinction between core and peripheral actors, adds another dimension that explains why some positions are more defensible than others.

From a practical standpoint, the framework developed in this research helps founders and investors assess where and how control can be gained. It highlights that successful startups often do not attempt to replicate the reach of AI Giants, but instead focus on narrow, high-value layers such as MLOps, vertical applications, or inference optimization. These actors can secure defensibility through Unique Solution, proprietary workflows, or tight customer integration. The results also caution against overemphasizing novelty; what matters more is whether a venture can adapt quickly, embed itself within the ecosystem, and maintain strategic relevance over time.

Several limitations shape the scope of the findings. The dataset consists of nine interviews, primarily from the European early-stage venture capital scene, which may not capture the full diversity of global AI strategies. Additionally, while theoretical constructs such as dynamic capabilities and ecosystem centrality were used to guide interpretation, not all were addressed directly in interviews. Some level of interpretive inference was therefore necessary, even with structured coding procedures.

Looking ahead, future research could further test the framework across different regional ecosystems or industries. Quantitative validation of CP typologies and their link to venture success would strengthen the generalizability of the findings. Longitudinal case studies could explore how CP configurations evolve as startups scale or reposition. Institutional factors such as regulation, public infrastructure, and government funding deserve more focused attention, especially as these forces begin to shape access to AI resources in new ways.

Ultimately, this study provides a conceptual and practical foundation for understanding how ventures navigate the layered architecture of AI ecosystems. By reframing defensibility as a dynamic and ecosystem-embedded challenge, it helps both scholars and practitioners rethink how competitive advantage is built in the age of artificial intelligence.

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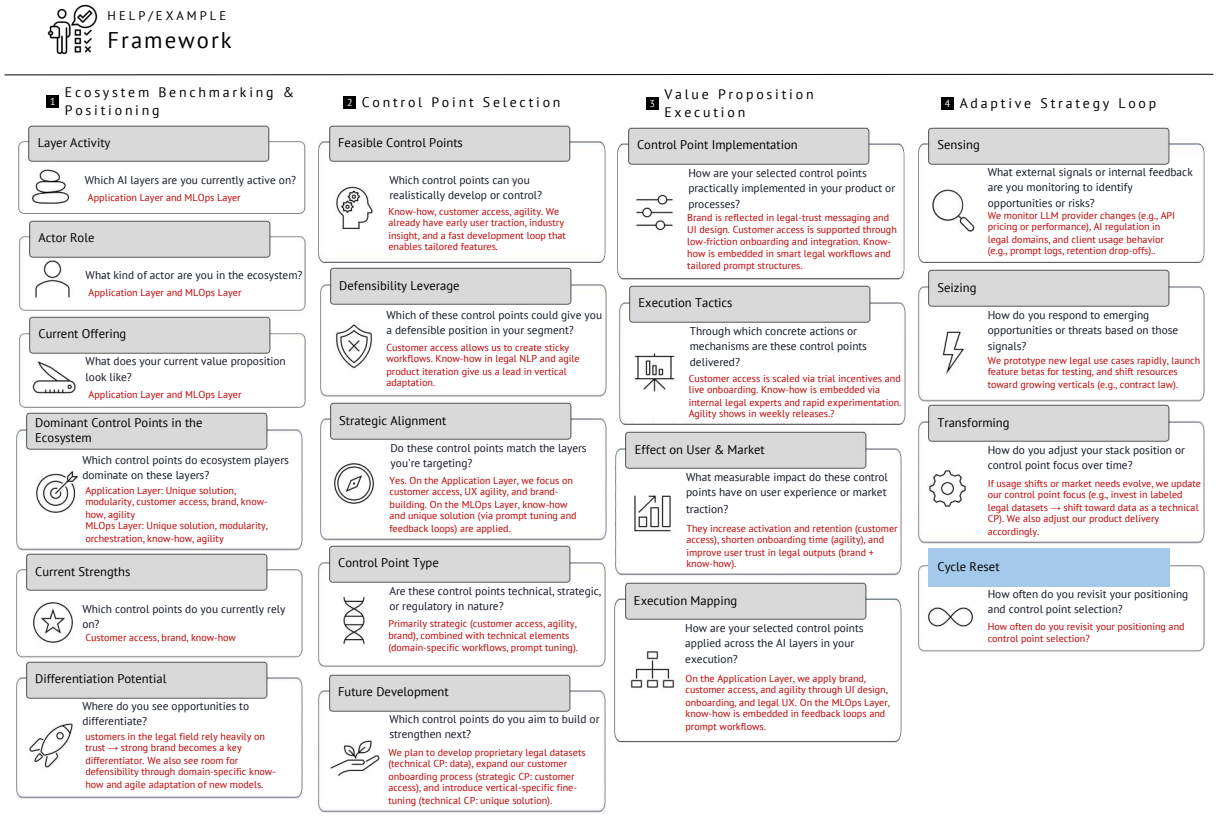
Appendices

Appendix A: Illustrative Use Case – AI Creator (LegalTech)

This use case is a fictional but realistic example designed to demonstrate how the strategic framework developed in this thesis can be applied in practice. It synthesizes patterns from the empirical data and reflects typical challenges and strategies of AI startups operating in the LegalTech domain.



Appendix B: Table A1: Coding Table

Layer Code	Code	First-Order Code	Quote	Second-Order Theme	3. Control Point Type	4. Defensibility from Competition	5. Actor group	6. AI Value Chain Position Ecosystem Role Relevance	7. Ecosystem Centrality (Core/Periphery)	8. Dynamic Capabilities
6	A1	Customer Access, Brand, Agility	„...Application Layer [...] Customer Access, Brand, Agilität..."	Agility	Strategic Control Points	Mittel – stark UX- & Vertriebsgetrieben	Startups	AI-powered Operator	Core	Sensing & Configuring (Kundennähe, UX-Kompetenz, Feature-Speed)
4	A10	Agilität, Innovationskraft	„Agilität und Innovation [...] competitive Edge [...] führender Punkt für Startups"	Agility	Strategic Control Point	Mittel – durch Schnelligkeit & Anpassungsfähigkeit, aber schwer langfristig haltbar	Startups	AI Creator	Periphery → Core (mit Erfolg)	Transforming (Marktreaktion, schnelle Lernzyklen)
4	A11	Agility, Weiterentwicklung, Aufschließen	„Wie schnell kann ich mich da weiterentwickeln [...] Market Standards [...] Agility..."	Agility	Strategic Control Point	Mittel – ermöglicht schnelle Adaption an Standards & neue Use Cases	AI Creators, Startups	AI Creator	Periphery → Core	Transforming (Standardadaption, Produktentwicklung)
4	A12	Brand	„Brands [...] sekundär [...] Foundational Model"	Brand	Strategic Control Point	Gering – wenig differenzierend im Massenmarkt	Alle	AI Creator	Periphery	-
4	A13	Daten, Content, Datenzugang	„Daten Daten Daten. Content Content. Die Qualität der Modelle..."	Content	Technical Control Points	Sehr hoch – Zugang zu proprietären Daten & Kurationsfähigkeiten schaffen Differenzierung	AI Creators, AI Giants	AI Creator	Core	Sensing & Configuring (Data Acquisition, Data Engineering, Pipeline-Optimierung)
4	A14	Customer Access	„Customer Access hat jeder"	Customer Access	Strategic Control Point	Gering verteidigbar – starker Wettbewerb, viele Zugangsmöglichkeiten	Alle	AI Creator	Periphery	Sensing (Kundenbedürfnisse erkennen, Nutzergewohnheiten analysieren)
4	A15	Accelerator-Partnerschaften	„Accelerators, Direct Investment [...] kein verteidigbarer Kontrollpunkt [...] entry in"	Customer Access	Strategic Control Point	Gering – Marktzugang, aber leicht reproduzierbar	AI Giants, Startups	AI Creator	Periphery	Sensing (Nutzeransprache, Einstiegsstrategien)
4	A16	Daten, Content, Datenzugang	„Daten Daten Daten. Content Content. Die Qualität der Modelle..."	Data	Technical Control Points	Sehr hoch – Zugang zu proprietären Daten & Kurationsfähigkeiten schaffen Differenzierung	AI Creators, AI Giants	AI Creator	Core	Sensing & Configuring (Data Acquisition, Data Engineering, Pipeline-Optimierung)
4	A17	Access to Talent	„Talent wäre für mich irgendwie der erste differenzierende Faktor, der dir einen Wettbewerbsvorteil verschaffen kann."	Know-how	Strategic Control Point	Geringe Verfügbarkeit von KI-Talent weltweit; defensible durch Talentbindung, Inhouse-Ausbildung, Standortpolitik	AI Creator, Diversifying Entrant	AI Creator / Enabler	Core	Sensing & Learning (Frühzeitige Rekrutierung, Wissenstransfer, Kompetenzaufbau)
4	A18	Know-how, Talent, AGI-Readiness	„Know-how [...] coachen von Mitarbeitern [...] super wichtiger Kontrollpunkt [...] auch Richtung AGI"	Know-how	Strategic Control Point	Hoch – durch Wissen, Talente, langfristige Forschung (AGI)	AI Creators, AI Giants	AI Creator	Core	Learning (Wissen bündeln, strategisches Talentmanagement)
4	A19	Market Design, Regulierung	„Market Design (Beispiel mit Deepseek aus DE verbannen)"	Market Design	Institutional Boundary	Mittel – politische Eingriffe regulieren Markt-Access, Datenzugang	AI Creator	AI Creator	External / Moderierender Einfluss	-
6	A2	Customer Access, Brand, Agilität	„...Application Layer [...] Customer Access, Brand, Agilität..."	Brand	Strategic Control Points	Mittel – stark UX- & Vertriebsgetrieben	Startups	AI-powered Operator	Core	Sensing & Configuring (Kundennähe, UX-Kompetenz, Feature-Speed)
4	A20	Modularität, Produktzuschnitt	„Modularität [...] verschiedene Modelle mit verschiedenen Outputs [...] wie OpenAI das ja ganz gut macht…"	Modularity	Generic Control Point	Mittel – ermöglicht flexible Produktarchitekturen, Upselling, Differenzierung	AI Creator (OpenAI), Startups	AI Creator	Core	Configuring (Feature Differenzierung, Preismodell-Anpassung)
4	A21	Austauschbarkeit via Standardisierung	„...relativ simpel austauschen [...] automatisch machen..."	Modularity	Generic Control Point	Gering – geringe Switching Costs durch API-Kompatibilität	Alle	AI Creator	Periphery	Configuring (Produktarchitektur flexibel halten)
4	A22	Developer Lock-in, Gratis-Tokens	„...Foundation Models dir gratis Token geben [...] du dein ganzes Produkt darum baust"	Networking	Strategic Control Point	Mittel – Zugang zu Entwicklernetzwerken, aber austauschbar	AI Creators, Startups	AI Creator	Core (temporär)	Configuring (Ökosystemanbindung, Bindungsstrategien)
4	A23	Brand	„Brand haben sie einen Kontrollpunkt! Sie haben das Thema Brand ganz für sich... gelten als absoluter Platzhirsch... weltweit ein Begriff"	Brand	Strategic Control Point	Hoch durch globale Markenwahrnehmung, Vertrauen & Sichtbarkeit	Incumbent	AI Enabler	Core	Sensing (Marktposition verstehen, Vertrauen aufbauen)

1	**A24**	Data plays no role (Infrastructure Layer)	„Daten spielt da noch keine Rolle (im Infrastructure Layer).“	Data(ausgeschlossen)	Technical Control Point	-	-	-	-	-
1	**A25**	Access to Commodities / Rare Earths	„...Access zu den Seltenen Erden [...] um in dieser Vielzahl Menge, die es ein NVIDIA tut - auch Chips zu produzieren“	Financial Resources	Strategic Control Point	Hochgradig CAPEX-intensiv; verteidigbar durch langfristige Lieferverträge, vertikale Integration, geopolitische Vorteile	Incumbent (z. B. NVIDIA)	AI Enabler	Core	Seizing (Ressourcensicherung, Lieferkettenaufbau, geopolitisches Navigieren)
1	**A26**	Financial Resources	„...wenn du es unbedingt willst und wie du gesagt hast ausreichend an Funding Power - financial resources dahinter hast...“	Financial Resources	Strategic Control Point	Hoch, da kapitalintensiv; Moat durch hohe Eintrittsbarrieren und Fähigkeit zur Skalierung	New Entrants, Diversifying Entrant , incumbent	AI Enabler	Core	Seizing (Mobilisierung von Kapital, Skalierung physischer Infrastruktur)
1	**A27**	Access to Talent	„Talent wäre für mich irgendwie der erste differenzierende Faktor, der dir einen Wettbewerbsvorteil verschaffen kann.“	Know-how	Strategic Control Point	Geringe Verfügbarkeit von KI-Talent weltweit; defensible durch Talentbindung, Inhouse-Ausbildung, Standortpolitik	New Entrants, Diversifying Entrant , incumbent	AI Creator, AI Giants, AI enabler	Core	Sensing & Learning (Frühzeitige Rekrutierung, Wissenstransfer, Kompetenzaufbau)
1	**A28**	Know-how (strategisch)	„Customer Access, Brand nicht, aber Know-how und financial resources, wenn ich hier bei strategisch gucke (auf der Infrastrukture Layer).“	Know-how	Strategic Control Point	Moderat verteidigbar durch technologische Tiefe, Rekrutierung & Lernprozesse	New Entrants, Diversifying Entrant , incumbent	AI Creator, AI Giants, AI enabler	Core	Learning (Technologische Tiefe aufbauen, Wissen bündeln)
1	**A29**	Modularität	„Modularität vielleicht […] verschiedene Chip-Stufen hier nach Anwendungsfall und Bedarf anbieten…“	Modularity*(ebenfalls generischer Kontrollpunkt laut Bohnsack)*	Generic Control Point	Mittel – ermöglicht flexible Produktarchitekturen und Skalierung	Incumbent	AI Enabler, AI Giant, Incumbent	Core	Configuring (Anpassungsfähigkeit technischer Lösungen)
6	**A3**	Customer Access, Brand, Agilität	„...Application Layer [...] Customer Access, Brand, Agilität...“	Customer Access	Strategic Control Points	Mittel – stark UX- & Vertriebsgetrieben	Startups	AI-powered Operator	Core	Sensing & Configuring (Kundennähe, UX-Kompetenz, Feature-Speed)
1	**A30**	Proprietary Software Stack / CUDA Standard	„...wenn NVIDIA sagt: ne unser Standard läuft nicht mit deinen Chips, wie schnell kriegst du denn da einen anderen Standard dann Upstream etabliert...“	Networking	Strategic Control Point	Starker Moat durch De-facto-Standards (CUDA), Entwicklerökosystem & Switching Costs	Incumbent	AI Enabler	Core	Configuring (Standard- und Schnittstellenpolitik, Entwicklungsökosystem aufbauen)
1	**A31**	Orchestration durch Partnerschaften	„Sie orchestrieren das ja komplett durch eigentlich [...] bis kurz vor breiten Markt und Application Layer...“	Orchestration	Strategic Control Point	Hoch durch zentrale Steuerung von Partnerstrukturen (Cloud, Models, etc.)	Incumbent	AI Giant	Core	Configuring (Koordinieren von Partnernetzwerken & Wertschöpfung)
1	**A32**	Scalability	„Scalability ist ein Punkt [...] Wenn du anfängst für Amazon zu bauen […] dann erst mal zwei neue Fabriken…“	Scalability *(bei Bohnsack als generischer Kontrollpunkt definiert)*	Generic Control Point	Sehr hoch – CAPEX-intensiv, abhängig von Fabrikbau, Supply Chain	Incumbent	AI Enabler	Core	Seizing (Kapazitätsplanung, Skalierung industrieller Produktion)
5	**A33**	Brand unwichtig	„Brand [...] nicht essentiell [...] keine Product-Marke“	Brand	Strategic Control Point	Gering – Unterstützungsfunktion, kein Differenzierungsmerkmal	Alle	AI Trader / Integrator	Periphery	-
5	**A34**	Content	„Content zum gewissen Grad auch wieder“	Content	Technical Control Point	Mittel – eingebetteter Content kann Modelloutput verfeinern	Startups	AI Trader / Integrator	Periphery	Configuring (Modell-Tuning, Prompting, Preprocessing)
5	**A35**	Industry Data + Unique Model	„Data und unique solution [...] industriespezifischeres Model bauen“	Kommentar	Technical Control Points	Hoch – Nischenlösungen, proprietäre Daten	Startups	AI Trader / Integrator	Core (in Nischen)	Sensing (Industrie-Know-how, Custom Data Loops)
5	**A36**	Know-how	„Mit nem gewissen Grad ist das dann auch Know-how“	Know-how	Strategic Control Point	Mittel – spezifisches technisches Wissen für Industrien	Startups	AI Trader / Integrator	Periphery → Core	Learning (Vertikales Prozesswissen)
5	**A37**	Industry Data + Unique Model	„Data und unique solution [...] industriespezifischeres Model bauen“	Unique Solution	Technical Control Points	Hoch – Nischenlösungen, proprietäre Daten	Startups	AI Trader / Integrator	Core (in Nischen)	Sensing (Industrie-Know-how, Custom Data Loops)
6	**A4**	Kein technischer USP, eher Prozesskompetenz	„Application Layer [...] selten unique solution [...] eher Business Case Wissen“	Know-how	Strategic Control Point	Mittel – durch Verständnis des ICP, UX, Businessprozesse	Startups	AI-powered Operator	Core	Sensing (Customer Insight, Use Case Empathie)
6	**A5**	Integrationsfähigkeit	„Integrierbarkeit [...] Grundvoraussetzung [...] ohne großen Aufwand“	Scalability(Bohnsack generischer Kontrollpunkt)	Generic Control Point	Mittel – API-Kompatibilität, Plug-and-Play	Startups	AI-powered Operator	Core	Configuring (Technische Anschlussfähigkeit)

2	A6	Brand	„Brand spielt hier bestimmt rein [...] AWS als Pionier [...] Microsoft, Google...“	Brand	Strategic Control Point	Mittel bis hoch – frühe Marktpräsenz (AWS), Markenassoziationen, Vertrauen	AI Giant	AI Giant	Core	Sensing (Vertrauensaufbau, Differenzierung im Commodity-Markt)
2	A7	Customer Access, Financial Resources, Sales Game	„...Financial resources und Customer Access am Ende [...] Cloud Plattformen [...] commodity Business [...] am Ende ein [...] Sales Game“	Customer Access	Strategic Control Points (kombiniert)	Mittel – Vertriebsreichweite, Preismodelle, Sales-Netzwerk	New Entrant	AI Trader / Integrator	Core	Seizing & Configuring (Vertriebsskalierung, Salesnetzwerke)
2	A8	Customer Access, Financial Resources, Sales Game	„...Financial resources und Customer Access am Ende [...] Cloud Plattformen [...] commodity Business [...] am Ende ein [...] Sales Game“	Financial Resources	Strategic Control Points (kombiniert)	Mittel – Vertriebsreichweite, Preismodelle, Sales-Netzwerk	Diversifying Entrant (AWS, Azure, GCP)	AI Giant	Core	Seizing & Configuring (Vertriebsskalierung, Salesnetzwerke)
2	A9	Infrastructure Access / Energiekosten	„Infrastructure Access [...] Thema Energie [...] langfristig [...] subventionierte Energie [...] eigenes Kraftwerk“	Operational Excellence	Technical Control Point	Hoch – Standortwahl, Energiekostenkontrolle, Subventionen → starker Standort-Moat	Incumbents & Startups	AI Enabler / AI Taker	Core	Seizing (Standortstrategie, Kostenkontrolle, Infrastrukturplanung)
6	B1	Brand	„[...] Branding mit Abstand [...]„	Brand	Strategic Control Points	Wettbewerbsvorteil durch Sichtbarkeit + Geschwindigkeit	New Enttrant(Octonomi)	AI Agent	Periphery	Seizing (Marktzugang durch aggressive Markenbildung & Ressourcenmobilisierung)
6	B10	Customer Access	„Weil jede Supportanfrage zuerst über den Octonomy-Agent läuft, hat das Unternehmen den direkten Zugang zu sämtlichen Kundeninteraktionen.“	Customer Access	Strategic	n.a.	Startup (Octonomi)	n.a.	Periphery	n.a.
6	B11	Data	Und die Kunden integrieren das System einfach in ihre vorhandenen Tools, wie Slack	Data	Technical	n.a.	New Entrant	n.a.	n.a.	n.a.
6	B12	Ressourcenbereitstellung	"Ja, und auch bei Polaris gab es (…) staatliche Unterstützung. Also die Bundeswehr stellt zum Beispiel auch Ressourcen bereit"	State Intervention	Institutional	Politisch vermittelte Marktchancen (Ressorucen als Wettbewerbsvorteil)	New Entrant (Polaris)	AI integrator	Core	Seizing (policy window erkennen und nutzen)
6	B13	Speed on Application Layer	„[...] Geschwindigkeit gerade auf dem Application Layer eben etwas Entscheidendes [...] bestehendes befähigt dich dazu schneller zu sein“ „[...] bei Application Layer ist es eben [...] Geschwindigkeit, wie schnell bin ich [...] da ist es de facto die Geschwindigkeit“	Strategic Agility	Strategic	Nutzung bestehender Tools für Time-to-Market-Vorteil	New Entrants	AI-powered Applications	Periphery	Seizing (schnelles Bauen auf vorhandener Infrastruktur)
2	B14	Finanzielle Flexibilität für strategische Entscheidunge	„[...] gibt der Company einen extrem Head-Start [...] gleichzeitig natürlich auch ganz extrem das Thema Financial resources"	Financial resources	Strategic	CAPEX, IP	New Entrant.	AI Enabler	Periphere	Seizing & Leveraging (staatliche Ressourcen mobilisieren & gezielt nutzen)
2	B15	Networking	„[...] gibt der Company einen extrem Head-Start [...] gleichzeitig natürlich auch ganz extrem das Thema (…) Know-how (…)"	Networking	Strategic	CAPEX, IP	New Entrant.	AI integrator	Periphere	Seizing & Leveraging (staatliche Ressourcen mobilisieren & gezielt nutzen)
2	B16	Price Pressure	„Größter Kontrollpunkt von Cloud Anbietern: günstigster Preis am Markt [...] scalability extrem entscheidend“	Scalybility	Generic Control point	Economies of Scale, Preisführerschaft, technische Skalierbarkeit	New Entrants	AI Enabler	Core	Seizing (Skalierbare Nutzung/Anpassung von Services)
2	B17	Direkte Staatliche Förderung	"Eines unserer Portfolio-companies hat) in Summe glaube ich 200mio (an Subventionen bekommen" „Diesen Push auf Staaten Ebene [...] trägt zur Besonderheit der Company bei“	State Intervention	Institutional	Politisch vermittelte Marktchancen (Subventionen als Wettbewerbsvorteil)	Start-up (Black Semiconductor)	AI Enabler	Core	Seizing (policy window erkennen und nutzen)
1	B18	Finanzielle Flexibilität für strategische Entscheidunge	„[...] gibt der Company einen extrem Head-Start [...] gleichzeitig natürlich auch ganz extrem das Thema Financial resources"	Financial resources	Strategic	CAPEX, IP	New Entrant.	AI Enabler	Periphere	Seizing & Leveraging (staatliche Ressourcen mobilisieren & gezielt nutzen)
1	B19	Know-how	„[...] gibt der Company einen extrem Head-Start [...] gleichzeitig natürlich auch ganz extrem das Thema (…) Know-how (…)"	Know-how	Strategic	CAPEX, IP	New Entrant.	AI Enabler	Periphere	Seizing & Leveraging (staatliche Ressourcen mobilisieren & gezielt nutzen)
6	B2	Financial resources	"Ähnlich wie financial resources, wir sehen es bei einem Octonomi (AI-Agent Statup für Customer Success) die verbrennen relativ viel Geld, aber die wachsen halt auch	Financial resources	Strategic	Wettbewerbsvorteil durch Sichtbarkeit + Geschwindigkeit	New Enttrant(Octonomi)	AI Agent	Periphery	Seizing (Marktzugang durch aggressive Markenbildung & Ressourcenmobilisierung)

			extrem schnell und das ist das worauf es Momentan in dem Bereich ankommt"							
1	**B20**	Networking	„[...] gibt der Company einen extrem Head-Start [...] gleichzeitig natürlich auch ganz extrem das Thema (…) Know-how (…)"	State Intervention	Strategic	CAPEX, IP	New Entrant.	AI Enabler	Periphere	Seizing & Leveraging (staatliche Ressourcen mobilisieren & gezielt nutzen)
1	**B21**	Direkte Staatliche Förderung	"Eines unserer Portfolio-companies hat) in Summe glaube ich 200mio (an Subventionen bekommen" „Diesen Push auf Staaten Ebene [...] trägt zur Besonderheit der Company bei“	State Intervention	Institutional	Politisch vermittelte Marktchancen (Subventionen als Wettbewerbsvorteil)	Start-up (Black Semiconductor)	AI Enabler	Core	Seizing (policy window erkennen und nutzen)
5	**B22**	Content	"Und formt das Wissen dass sie dann haben in konkrete Handlungsempfehlungen um"	Content	Strategic	n.a.	New Entrants	n.a.	n.a.	n.a.
5	**B23**	Speed of Adoption	„[...] Geschwindigkeit auf einer anderen Ebene [...] wie schnell ist der Markt soweit [...] responsible AI vernünftig anwenden [...]“	Customer Access	Strategic	Vorteil durch frühe Marktakzeptanz & Nutzerintegration	Start-up (QuantPi)	AI integrator	Periphery	Sensing (Marktreife antizipieren)
5	**B24**	Data	ohne sensible Kundendaten zu speichern	Digital Infrastrucutre (nicht Data)	Technical	n.a.	New Entrant	n.a.	n.a.	n.a.
5	**B25**	Data	Und die Kunden integrieren das System einfach in ihre vorhandenen Tools, wie Slack	Digital Infrastrucutre (nicht Data)	Technical	n.a.	New Entrant	n.a.	n.a.	n.a.
5	**B26**	Know-how	„Know-how definitiv [...]	Know-how	Strategic	Technisches Vertrauen + breite Nutzbarkeit	New Entrant.	AI Integrator	Periphere	Learning & Leveraging (Modellentwicklung & Transfer auf andere Modelle)
5	**B27**	Modularity	„Und die Kunden integrieren das System einfach in ihre vorhandenen Tools, wie Slack oder Zendesk, ohne zusätzliche IT-Aufwände.“	Modularity	Generic		New Entrants	AI Creator, AI Integrator / Trader		
5	**B28**	Modularity	plus die Tatsache, ich kann das über sämtliche meiner im Einsatz befindenden Ai-Modelle in Einsatz bringen.	Modularity	Strategischer Kontrollpunkt	n.a	Diversifiying Entrants	AI giant, AI enabler	n.a	n.a
5	**B29**	Networking	QuantPi hat es geschafft, sich früh in die richtigen Netzwerke reinzubewegen, also da, wo Standards entstehen	Networking	Strategic	n.a.	New Entrant.	n.a	n.a	n.a
6	**B3**	Know-how	„[...] Branding mit Abstand das wichtigste [...] financial resources [...] Know-how“	Know-how	Technical	Wettbewerbsvorteil durch Sichtbarkeit + Geschwindigkeit	New Enttrant(Octonomi)	AI Agent	Periphery	Seizing (Marktzugang durch aggressive Markenbildung & Ressourcenmobilisierung)
5	**B30**	Scalability	"gleichzeitig auch das Thema scalability [...]“	Scalability	Generic Control point	Technisches Vertrauen + breite Nutzbarkeit	New Entrant.	AI Integrator	Periphere	Learning & Leveraging (Modellentwicklung & Transfer auf andere Modelle)
5	**B31**	Scalability	„Dazu kommt, dass bei Lastspitzen oder mehr eingehenden Anrufen Octonomy und die Agents einfach automatisch hochfahren, ohne dass das Supportteam etwas umstellen muss.“	Scalability	Strategic	n.a.	New Entrants	AI Integrator	Periphery	n.a.
5	**B32**	Strategic Agility	„Dann schaffen sie es, ihre Modelle beim Kunden extrem schnell hochzufahren; oft ist der Agent in wenigen Tagen produktiv.“	Strategic Agility	Strategic		New Entrants			
5	**B33**	Strategic Agility	Kann der Kunde ein Modell testen regelmäßig über Quantpi	Strategic Agility	Strategic		New Entrants			
5	**B34**		"Was sonst noch krass ist: Octonomi hat die Bots so trainiert, dass sie kaum noch halluzinieren."	Unique Solution	Technical	n.a.	New Entrant	n.a.	n.a.	n.a.
5	**B35**		definitiv, weil das halt was ist, was nicht trivial ist KI erklärbar zu machen	Unique Solution	Technical	n.a.	New Entrant	n.a.	n.a.	n.a.
7	**B36**	Responsible AI, Adoption Speed	„[...] für MLops Thema ist [...] Adoption ein Thema [...] wie schnell ist der Markt soweit [...] sowas wie responsible AI vernünftig anwenden [...]“	Customer Access	Strategic	Adoptionsabhängige Differenzierung – Zugang durch Erklärung & Reife	Start-up (QuantPi)	AI integrator, AI Creaotor, AI Giant	Periphery	Sensing & Seizing (Marktreife antizipieren, passende Lösung bereitstellen)
7	**B37**	Orchestration	plus die Tatsache, ich kann das über sämtliche meiner im Einsatz befindenden Ai-Modelle in Einsatz bringen.	Orchestration	Strategischer Kontrollpunkt	n.a	Diversifiying Entrants	AI Giant	n.a	n.a

7	**B38**	Scalability	"gleichzeitig auch das Thema scalability [...]“	Scalability	Generic Control point	Technisches Vertrauen + breite Nutzbarkeit	New Entrant.	AI Integrator	Periphere	Learning & Leveraging (Modellentwicklung & Transfer auf andere Modelle)
7	**B39**	Content	Und sie liefern dann Berichte über Fairness, Performces.	Content	Strategic	n.a.	New Entrants	n.a.	n.a.	n.a.
4	**B4**	Brand	...spannender Weise zum einen eine Brand Thematik [...] zusätzlich [...] technical control point data [...]“	Brand	Technical	Datenvorsprung + Markenwahrnehmung = Lock-in	New Enttrant (OpenAI…etc.), Diversifying Entrant	AI creator, AI Giant	Core	Leveraging (Marktposition durch Data Flywheel & Branding verstärken
4	**B5**	Data	...spannender Weise zum einen eine Brand Thematik [...] zusätzlich [...] technical control point data [...]“	Data	Technical	Datenvorsprung + Markenwahrnehmung = Lock-in	New Enttrant (OpenAI…etc.), Diversifying Entrant	AI creator, AI Giant	Core	Leveraging (Marktposition durch Data Flywheel & Branding verstärken
4	**B6**	Data Speed for Model Quality	„[...] wie schnell kann ich saubere Daten generieren, die helfen [...] das Foundational Model zu verbessern“	Data	Technical	Wettbewerbsvorteil durch besseren Trainingsdaten-Zyklus	New Entrant	AI Creator	Core	Learning (kontinuierliche Datenverbesserung)
7	**B7**	Know-how	„[...] Branding mit Abstand das wichtigste [...] financial resources [...] Know-how“	Know-how	Technical	Wettbewerbsvorteil durch Sichtbarkeit + Geschwindigkeit	New Enttrant(Octonomi)	AI Agent	Periphery	Seizing (Marktzugang durch aggressive Markenbildung & Ressourcenmobilisierung)
7	**B8**	Brand	„[...] Branding mit Abstand [...]„	Brand	Technical	Wettbewerbsvorteil durch Sichtbarkeit + Geschwindigkeit	New Enttrant(Octonomi)	AI Agent	Periphery	Seizing (Marktzugang durch aggressive Markenbildung & Ressourcenmobilisierung)
6	**B9**	Content	"Und formt das Wissen dass sie dann haben in konkrete Handlungsempfehlungen um"	Content	Strategic	n.a.	New Entrants	n.a.	n.a.	n.a.
6	**C1**	Customer Access, Data Ownership	„...Endkunden Zugang [...] Daten und Content [...] darüber holst du deine Wertschöpfung“	Customer Access	Strategic Control Point	Mittel – Marktzugang als Kern der Wertschöpfung	AI-powered Operators	AI-powered Operator	Core	Sensing (Kundenbindung), Seizing (Data-driven UX)
2	**C10**	Weniger F&E-Fokus im Vergleich zur Infrastruktur	„...hier vielleicht weniger wichtig [...] Forschungskompetenz [...] nicht so stark wie im Chip-Bereich“	Know-how	Kein Kontrollpunkt auf Cloud-Level	-	-	-	-	-
2	**C11**	Global Reach, Regional Scaling	„...große Abdeckung [...] Kunden überall erreichen [...] relevante Märkte [...] mit Kosten verbunden“	Scalability	Generic Control Point	Mittel – Coverage durch lokale Präsenz, Infrastruktur, Verträge	Incumbents	AI Giant	Core	Configuring (Regionale Skalierung, Infrastrukturverfügbarkeit)
2	**C12**	Performance, Unique Solution	„...Brand und Kundenbeziehung nicht so wichtig... sondern Qualität der Leistung und Performance [...] wenn Chip-Anbieter das liefern [...] wird das gekauft“	Unique Solution - Als Kundenzugang	Technical Control Point	Hoch – objektive Leistung zählt mehr als bestehende Bindungen	AI Giants, Chipanbieter	AI Enabler / Creator	Core	Sensing (Performance evaluieren, Anpassung)
4	**C13**	Brand, Customer Access	„gute Brand und guter Endkundenzugang [...] ChatGPT kennt jeder [...] Deepseek kennt kaum jemand“	Brand	Strategic Control Points	Mittel – Zugang & Vertrauen bestimmen Marktverbreitung	AI Creators	AI Creator	Core	Sensing (Marktpräsenz, Nutzerbindung)
4	**C14**	Datenkosten sinken, Spezialisierung	„...Kosten für Daten [...] werden runtergehen [...] spezialisierte Modelle [...] weniger Datenpunkte [...] kostengünstiger“	Data(verliert Relevanz)	-	Geringere Bedeutung – zunehmend Commodity, außer bei Edge-Cases	AI Creators	AI Creator	Core → Periphery (bei General Data)	Reconfiguring (Datennutzung optimieren, Use-Case-Fit erhöhen)
4	**C15**	Financial Resources, Compute Investment	„...tiefe Taschen [...] Rechenleistung einkaufen [...] Wettbewerbsvorteil [...] klarer Moat“	Financial Resources	Strategic Control Point	Hoch – CAPEX in Compute, Trainingszyklen, Infrastruktur	AI Giants, New Entrants	AI Creator	Core	Seizing (Infrastruktur & Training finanzieren)
4	**C16**	Personal, Forschungsnähe	„Personal ultra wichtig [...] LLMs vernünftig trainieren [...] Forschungsnähe [...] bestes Modell“	Know-how	Strategic Control Point	Hoch – durch Forschungsnähe, Datenkompetenz, Trainingswissen	AI Creator (z. B. OpenAI, Deepseek)	AI Creator	Core	Learning (Modelltraining, Architekturentwicklung)
4	**C17**	Market Design	„...Market Design [...] Frage ob Moat [...] Beispiel Mistral“	Market Access Design	Strategic Control Point	Mittel – strukturelle Marktgestaltung	AI Creators	AI Creator	Core	Configuring (Plattformzugang, Standardsetzung)
4	**C18**	Orchestrierung (Marketing & Plattformstrategie)	„Orchestrierung [...] Marketing Game [...] weniger Ops [...] alles rein digital“	Orchestration	Strategic Control Point	Mittel – Sichtbarkeit, Partnerintegration, Strategie	AI Creators	AI Creator	Core	Configuring (Plattformwirkung, Ökosystemzugang)
1	**C19**	Financial Resources, M&A	„...Börsengelistet [...] ganz andere Finanzkraft [...] einfach aufzukaufen...“	Financial Resources	Strategic Control Point	Hoch – Zugang zu Kapitalmärkten, schnelle M&A-Fähigkeit	Incumbents	AI Enabler / AI Giant	Core	Seizing (Kapitalmobilisierung, Akquisitionen)
6	**C2**	Industry & Customer Data	„Zugang zu den Kundendaten und zu den Industrie Daten [...] dein Moat am Ende des Tages“	Data	Strategic Control Point	Mittel – Datenbesitz für spezifische Use Cases	AI Takers / AI-powered Applications	AI-powered Operator	Core	Sensing (Kundenverständnis, Use-Case-Anpassung)

1	**C20**	Capital Access, Talent Access	„...capital Zugang fehlt [...] Forschung anstellst [...] Talent einkaufen [...] Finanzierungslücke [...] schwer für New Entrants..."	Financial Resources, **Know-how**	Strategic Control Points	Hoch – durch VC, Forschung, Personalbindung	Startups vs. Incumbents	AI Enabler / AI Creator	Core	Seizing (Kapital organisieren, Wissen fokussieren)
1	**C21**	Talent, Forschungskompetenz	„...Talent [...] sehr nah am Thema Forschung [...] Rohstoffe [...] Capabilities [...] worauf Layer aufsetzen"	Know-how	Strategic Control Point	Hoch – Forschungsnähe, Deep Tech Kompetenz, Scarcity	Startups vs. Incumbents	AI Enabler	Core	Learning (Technologische Kompetenzentwicklung, Talentbindung)
1	**C22**	Talent, Retention, Acquihires	„...Talent kaufen [...] eigenes Talent anstellen [...] inhouse intensivieren [...] retainen..."	Know-how	Strategic Control Point	Hoch – durch Talentbindung, Employer Brand, Integration	Incumbents	AI Enabler	Core	Learning (Retention, Integration, Inhouse-Kompetenzaufbau)
1	**C23**	Organisatorische Orchestrierung	„...Organisation Level [...] Ressourcen deployen [...] Moat..."	Orchestration	Strategic Control Point	Mittel – Fähigkeit zur Ressourcenverteilung als strategisches Asset	Incumbents	AI Giant	Core	Configuring (Ressourcenzuordnung, Organisationsdesign)
1	**C24**	Operational Scale	„...at scale arbeiten kannst"	Scalability	Generic Control Point	Hoch – skaliertes Deployment, Economies of Scale	Incumbents	AI Enabler	Core	Seizing & Configuring (Skalierung, Deployment, Supply Chain Effizienz)
1	**C25**	Skalierungswissen	„...wie skaliere ich so eine Organisation, wie skaliere ich Datenzenter"	Scalability(als Enabler)	Enabler	Mittel – Erfahrung und Wissen für organisatorische Skalierung	Startups	AI Enabler	Core (wenn verfügbar)	Configuring (Organisationsentwicklung, Skalierungsroutinen)
1	**C26**	Staatliche Unterstützung	„...state intervention [...] staatliche Finanzierung [...] New Entrants [...] Incumbents"	State Intervention	Enabler	Mittel – Zugang zu Förderung, Projektvergabe	Startups & Incumbents	Alle Rollen	Periphery → Core (je nach Umfang)	Seizing (Öffentliche Ressourcen nutzen)
5	**C27**	Agility, Networking	„Agilität [...] Anpassung an Marktgegebenheiten [...] Wettbewerbsvorteil [...] Netzwerk dazu"	Agility + **Develo per Relations**	Enabler	Mittel – schnelle Integration, Kooperationsfähigkeit	Startups	AI Trader, AI creator	Periphery	Reconfiguring (schnelle Reaktion auf Modelländerungen)
5	**C28**	Markenabhängigkeit, Add-on-Funktion	„...profitierst [...] von der Brand vom Player da drunter [...] nicht wahnsinnig viel Macht..."	Customer Access(indirekt via Foundation Model)	Strategic Control Point	Gering – keine eigene Sichtbarkeit beim Endkunden	AI Traders / Startups	AI Trader	Periphery	Leveraging (Kooperation mit Core-Playern)
5	**C29**	Industry Data, Co-created Data	„Data [...] Datenschätze [...] generierst mit Kunden [...] Content"	Digital Infrastrucutre (nicht Data)	Strategic Control Point	Mittel – Use Case Optimierung, Modell-Feintuning	AI-powered Applications, Traders	AI Trader / Operator	Periphery	Learning (Daten-basierte Optimierung)
6	**C3**	Domain Expertise	„Talent [...] Business Logik [...] Bedarf der Kunden abzugreifen [...] anderes Talent"	Know-how	Strategic Control Point	Mittel – kundenzentrierte Umsetzung	AI Takers / AI-powered Applications	AI-powered Operator	Core	Learning (Prozessverständnis, User-orientierte Entwicklung)
5	**C30**	Talent statt Kapital	„...Talent wiederum, was hier wichtig ist [...] kleinerer Teil der Wertschöpfung [...] weniger Kapital benötigt"	Know-how	Strategic Control Point	Mittel – Engineering-Wissen, Use Case Spezialisierung	Startups	AI Trader	Periphery	Learning (Technische Spezialisierung, Nischenbesetzung)
7	**C31**	Service Agility, Expert Branding	„Service basiert auf Know-how [...] Agility [...] strategisch aufstellen [...] Brand in Abzügen"	Agility	Enabler	Gering – kein struktureller Moat, nur Wissensvorsprung	AI Integrator / Consultants	AI Integrator	Periphery	Learning (Methodenkompetenz), Sensing (Positionierung)
7	**C32**	Expert Brand	„Brand [...] wenn du dir Namen gemacht hast [...] kannst du profitieren"	Brand	Enabler	Gering – persönliche Reputation	AI Traders	AI Integrator	Periphery	Sensing (Marktpositionierung durch Reputation)
7	**C33**	Service Agility, Expert Branding	„Service basiert auf Know-how [...] Agility [...] strategisch aufstellen [...] Brand in Abzügen"	Brand	Enabler	Gering – kein struktureller Moat, nur Wissensvorsprung	AI Integrator / Consultants	AI Integrator	Periphery	Learning (Methodenkompetenz), Sensing (Positionierung)
7	**C34**	Beratung, Wissensverkauf	„...Service Layer [...] kein technischer und kein finanzieller Moat [...] Know-how [...] Berater"	Know-how	Strategic Control Point	Gering – Wissensabhängigkeit, kaum Skalierung	AI Traders / Integrators	AI Integrator	Periphery	Learning (Expertenwissen aktuell halten)
7	**C35**	Service Agility, Expert Branding	„Service basiert auf Know-how [...] Agility [...] strategisch aufstellen [...] Brand in Abzügen"	Know-how	Enabler	Gering – kein struktureller Moat, nur Wissensvorsprung	AI Integrator / Consultants	AI Integrator	Periphery	Learning (Methodenkompetenz), Sensing (Positionierung)
2	**C4**	Agility, Strategic Direction	„Agility [...] Zugriff auf Infrastruktur Ressourcen [...] First Mover [...] Richtung laufen"	Agility	Enabler	Mittel – Reaktionsgeschwindigkeit, Differenzierung	Startups & Big Player	AI Trader / Integrator	Core (für Startups), Periphery (für Giants)	Reconfiguring (Ressourcen neu kombinieren, Geschwindigkeit)
2	**C5**	Brand Asymmetrie	„Brand ist für Incumbents weniger wichtig [...] für kleinere Player muss aufgebaut werden"	Brand	Strategic Control Point	Mittel – für Startups zur Differenzierung wichtig	Incumbents vs. Startups	AI Giant / AI Enabler	Core	Sensing (Brandaufbau als Vertrauensanker)
2	**C6**	Brand, Customer Loyalty, Customer Access	„...Brand noch mal wichtiger [...] kommst näher an den Kunden ran [...] Kundenbindung durch Programme, Credits..."	Brand	Strategic Control Points	Hoch – durch Programmbindung, Sichtbarkeit, Vertrauensvorschuss	Incumbents (AWS, GCP, Azure)	AI Giant	Core	Sensing & Configuring (Marktpositionierung, Nutzerbindung)
2	**C7**	Content ≠ Differentiator	„Content [...] auch bei Cloud [...] kein langfristiger Moat [...] Infrastruktur entscheidender"	Content Access	-	Gering – Nutzung, aber keine Marktabschirmung	Startups & Incumbents	AI Enabler / Trader	Periphery	-

2	**C8**	Customer Access, Scale Advantage	„...Kundenbeziehung [...] Cloud Kapazitäten zur Verfügung stellen [...] Vorteil gegenüber anderen Playern..."	Customer Access	Strategic Control Point	Mittel – durch Marktanteile, Infrastrukturbreite & Vertriebsreichweite	Incumbents	AI Enabler	Core	Sensing (Kundennähe, Kapazitätsausbau für Partner)
2	**C9**	Financial Resources, International Scaling	„Finanzmittel [...] brauchst mehr als ein Rechenzentrum [...] große Coverage [...] Player akquirieren"	Financial Resources	Strategic Control Point	Hoch – durch Kapital Marktzugang, Akquisition, Expansion	Incumbents & Startups	AI Giant	Core	Seizing (Investitionen, Expansion, Standortstrategie)
6	**D1**	Markenreputation und -vertrauen bei Kunden und Partnern	„Reputation, hundert Prozent" (bezogen auf Verticals)	Brand & Reputation	Strategic	Markenimage, Vertrauen und Bekanntheit sind für Verticals entscheidend, z. B. bei Insurance oder Recruiting-Plattformen. Symbolic Moat (Trust, Perception)	New Entrants, Diversifying Entrants	AI Creator, Giants	Periphery	Sensing (Marktwahrnehmung), Seizing (Reputation aktiv aufbauen)
6	**D10**	Zentrale Koordination des gesamten Ökosystems	"Es gibt OpenRouter. Das ist eine Meta-Struktur – du hast dann einen Account und einen API Key bei OpenRouter, und der wählt immer die API, die gerade zur Verfügung ist, die die beste Uptime und die beste Latency hat (...). (Kontrollpunkt der der den API auswählt)"	Orchestration	Strategischer Kontrollpunkt	Schafft Lock-in-Effekte durch einheitliche Schnittstelle zu verschiedenen AI-Modellen	Diversifiying Entrants	AI Giant, AI Creator	Periphery, Production Layer	Sensing (Provider-Performance), Seizing (API-Aggregation), Transforming (Ecosystem-Orchestration)
6	**D11**	System Prompt Optimization	„der System Prompt [ist] unglaublich wichtig (…) da ist der System Prompt der Moat"	Unique Solution	Technical	Proprietäres Know-how, schwer replizierbare Optimierung	New Entrants,	AI Creators	Periphery	Sensing (User-Bedürfnisse), Seizing (Prompt-Engineering)
6	**D12**	Long Context	"im Bereich Coding Agents –, ist, dass bei zu langer Benutzung, bei zu langen Sessions, das LLM irgendwann keinen Output mehr generieren konnte,"	Unique Solution (Long-context arc hitecture)	Technical	"Moat durch algorithmische Techniken und Heuristiken zur Inference Time wenn die LLMs schon deplayed sind"	Diversifying Entrants, New Entrants	AI Giants, AI Creator	Periphery	n.a.
2	**D13**	Wahrnehmung von Qualität und Zuverlässigkeit in der Branche	„(…) Branding und Reputation für Data Storage und Sensor (…) – Sensor wahrscheinlich eher aus dem Sinne, (…) weil es auch eine Physical World ist. . Sensor (…) weil es eine Physical World ist (…) Safety-Frage (…) Reputation"	Brand & Reputation	Strategic	Brand-Driven Trust Moat	Incumbents	Enabler	core	Sensing (Safety-Anforderungen), Seizing (Qualitätszertifizierungen)
2	**D14**	Intermediär-Position in der Customer Journey	Aber deshalb ist es auch ein Pricing War (...). Sowohl ein Pricing War als auch der Versuch, neue Start-ups oder Developer reinzulocken in ihr System – indem sie ihnen Credits geben und sie hochstufen. Also es ist eher so ein War darum, viele Nutzer zu bekommen."	Customer Access	Strategic	Wettbewerbsstrategie durch Preisgestaltung und Nutzerakquisition	Enabler, Diversifying Entrants	Ai-Giants	Core	Seizing - Kompetitive Positionierung durch Pricing-Strategien
2	**D15**	Intermediär-Position in der Customer Journey	Aber deshalb ist es auch ein Pricing War (...). Sowohl ein Pricing War als auch der Versuch, neue Start-ups oder Developer reinzulocken in ihr System – indem sie ihnen Credits geben und sie hochstufen. Also es ist eher so ein War darum, viele Nutzer zu bekommen."	Customer Access	Strategic	Wettbewerbsstrategie durch Preisgestaltung und Nutzerakquisition	Enabler, Diversifying Entrants	Ai-Giants	Core	Seizing - Kompetitive Positionierung durch Pricing-Strategien
2	**D16**	Long Context / Memory	„Data Storage (…) das ist ein wichtiger Kontrollpunkt – wenn Leute dich brauchen"	Data Management Platforms	Technical	Performance-based Infrastructure Moat	Infra-Anbieter Enablement	AI Giant, AI trader	Core	
2	**D17**	General Compute & Cloud Backbone + evtl. „Alternative GPU Stack"	"Microsoft mit Azure. Die haben ja auch riesige Data Center mit GPUs. Und die haben AMD-GPUs gekauft und riesige Serveranlagen gebaut, die ein viel besseres Preis-Leistungs-Verhältnis haben"	Digital Infrastructure	Technical Control Point	Structural Moat - Infrastructure Control + strategische Partnerschaften	Diversifying Entrant (Microsoft)	AI Giant	Core	Seizing (strategische Investitionen in alternative Infrastruktur)
2	**D18**	Kapital als Moat	". Cerebras beispielsweise versucht, AI-Accelerators zu bauen für Inference, aber es sind eben wenige Player und die GPUs sind extrem teuer. "	Financial resources	Strategic	Hohe Investitionskosten (CapEx) bedeuten: Nur kapitalstarke Akteure können diesen Layer dominieren oder überhaupt betreten.	New Entrant.	AI creator	Periphere	n.a.
2	**D19**	Financial Resources	"Die Capital Expenditures für genug GPUs, um deinen Moat durch Kapital zu bauen [...] sind exorbitant. Das schafft man nicht als kleines, mit wenig Kapital ausgestattetes Start-up"	Financial Resources for Specialized Infrastructure as a moat	Strategic Control Point	Structural Moat - Kapitalbarrieren	Incumbent	AI enabler	Core	Seizing (Kapitalallokation für Ressourcen)

6	D2	Brand & Trust in AI Consumption	„Branding und Reputation (…) bei AI Consumption extrem wichtig (…) bei Verticals (…) Vertrauen“	Brand & Reputation	Strategic	Symbolic Moat (User Trust)	New Entrants, Diversifying Entrants	AI Creator, Giants	Core	Sensing (Kundenvertrauen), Seizing (Brand-Kommunikation)
2	D20	Strategische Partnerschaften	„Strategische Partnerschaften mit denen, die tatsächlich die Data Center betreiben – also wie Azure oder AWS."	Networking	Strategischer	Langfristige Verträge und Integration schaffen Abhängigkeiten, aber viele Cloud-Provider vorhanden	New Entrants	AI integrator	Core	Seizing (Partnerschaftsaufbau)
2	D21	Zentrale Koordination des gesamten Ökosystems	"Es gibt OpenRouter. Das ist eine Meta-Struktur – du hast dann einen Account und einen API Key bei OpenRouter, und der wählt immer die API, die gerade zur Verfügung ist, die die beste Uptime und die beste Latency hat (...). (Kontrollpunkt der der den API auswählt)"	Orchestration	Strategischer Kontrollpunkt	Schafft Lock-in-Effekte durch einheitliche Schnittstelle zu verschiedenen AI-Modellen	Diversifiying Entrants	AI enabler, AI Giant, AI integrator	Periphery, Production Layer	Sensing (Provider-Performance), Seizing (API-Aggregation), Transforming (Ecosystem-Orchestration)
2	D22	Developer-Ecosystem-Lock-in	„Technical Standards – Nvidia, CUDA (…) strategischer Vorteil (…) jeder Engineer kann das“	Unique Solution - Als Kundenzugang	Technical	Platform Lock-in via Ecosystem Familiarity	New Entrant	AI Giant	Core	Sensing (Developer-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
2	D23	Proprietary Hardware Standards	Google etabliert proprietäre Standards auf Hardwareebene – Alternative zu CUDA, strategische Kontrolle über AI-spezifische Architekturen.	Unique Solution - Als Kundenzugang	Technical	Proprietäre Hardware-Standards, strategische Kontrolle über AI-Architekturen	Diversifying Entrants	AI Giant	Core	Sensing (Hardware-Trends), Seizing (Standard-Entwicklung), Transforming (Architecture-Control)
2	D24	Demokratisieren Acess zu GPU	"Es gibt tatsächlich – das jetzt als Sidenote – viele Startups, die das attackieren wollen, weil sie erkannt haben: Der Access zu GPUs ist viel zu teuer. Sie wollen das demokratisieren und öffnen"	Unique Solution - Als Kundenzugang	Technical	n.a.	New Entrant	Enabler	Periphere	n.a.
8	D25	API-Systeme: Handling von erhöhten Request-Volumina	"Rate Limiting war essentiell - wir mussten Anfragen drosseln, um die Stabilität zu gewährleisten."	Scalability	Generic Control point		Cross-cutting		n.a.	
8	D26	Verteilung von AI-Models auf verschiedene Hardware-Konfigurationen	"Wir deployen dasselbe AI-Model auf CPUs, GPUs und TPUs je nach Anforderung."	Scalability	Generic Control point		Cross-cutting		n.a.	
8	D27	Strategische Partnerschaften	"Ein Beispiel für Networking – für den Networking Effect – ja, hundertprozentig. Es entstehen die ganze Zeit Partnerschaften (...) Ich glaube, es passiert sehr stark arbeitsteilig. Und es ist auch ein Bereich, wo sie das zulassen."	Networking	Strategischer	Relationship-based Moat	Incumbents, New Entrants, Diversifying Entrants	Ecosystem-weite Dynamik	Core	Sensing (Partnerschafts-Opportunitäten), Seizing (Kollaborationsaufbau), Transforming (Ecosystem-Evolution)
3	D28	Wahrnehmung von Qualität und Zuverlässigkeit in der Branche untereiander (Netzwerk)	„(…) Branding und Reputation für Data Storage und Sensor (…) – Sensor wahrscheinlich eher aus dem Sinne, (…) weil es auch eine Physical World ist. . Sensor (…) weil es eine Physical World ist (…) Safety-Frage (…) Reputation“	Network	Strategic	Brand-Driven Trust Moat	New Entrant	AI integrator	core	Sensing (Safety-Anforderungen), Seizing (Qualitätszertifizierungen)
3	D29	High-quality labeled data	„…High-Quality-Data Labels für Supervised Learning und … für Reinforcement Learning… Expertenmeinungen… viel Daten…“	Data	Technical Control Point	Expertenlabels knapp	New Entrants and Incumbents	AI Creator, AI Giants, AI trader/integrator	Periphere	Sensing (Erkennung des Datenbedarfs für spezifische ML-Verfahren) Ein Teil seiner Gewinns immer weiter in Daten-Labeling investieren und so moat aufbauen
6	D3	Content	{Content sehe ich als relevant für} Visualization und Data Management."	Content	Strategic	Structural Moat - Content-Kontrolle für Visualisierung	New Entrants	n.a.	Periphere	Transforming - Content-Optimierung für Nutzererfahrung
3	D30	Model Provenance & Training Data Quality	"Deshalb hat Meta scale AI gekauft (Wegen High-Quality-Data und das Competitor nicht an die Daten kommen)"	Data -> Aquisision thorugh financial resources to get knowledge und Data	Strategic Control Point	Structural Moat - strategische Akquisition für Datenkontrolle	New Entrants and Diversifying Entrant	AI Giants, AI Traders/integrator	Periphere	Seizing (strategische Übernahme zur Ressourcensicherung) Seizing (defensive Strategie zur Marktmacht)

3	**D31**	Long Context Processing Capabilities	„…kein LLM wurde trainiert mit Datenpunkten > 1–2 Mio Token… wer das schafft, wird gewinnen.“	Unique Solution (Long-context arc hitecture) --> Agility	Technical	Technologische Führerschaft, First-Mover-Advantage, hohe technische Barrieren	Diversifying Entrants, New Entrants	AI Giants, AI Creator	Core	Sensing (technische Grenzen), Seizing (Ressourcen-Allokation), Transforming (neue Architekturen)
4	**D32**	API Gateway / API-Router	„OpenAI hat ihre API, Anthropic hat ihre API, Google hat ihre API.“ / „OpenRouter […] wählt immer die API, die gerade zur Verfügung ist, die die beste Uptime und die beste Latency hat.“	API Gateway	Technischer Kontrollpunkt	Mittlere Verteidigungsfähigkeit durch Infrastruktur und Nutzerbindung	Incumbent	Emabler	Periphere	Seizing (Optimierung durch API-Vergleichsplattform)
4	**D33**	Data	Data ist relevant für die established Foundational Labs. Und Data ist relevant für Verticals	Data	Technical	n.a.	Diversifying Entrant, New Entrant	AI Creator, AI-Giant	Periphere	n.a.
4	**D34**	Model Provenance & Training Data Quality	"Deshalb hat Meta scale AI gekauft (Wegen High-Quality-Data und das Competitor nicht an die Daten kommen)"	Data -> Acquisition through financial resources to get knowledge und Data	Strategic Control Point	Structural Moat - strategische Akquisition für Datenkontrolle	New Entrants and Diversifying Entrant	AI Giants, AI Traders/integrator	Periphere	Seizing (strategische Übernahme zur Ressourcensicherung) Seizing (defensive Strategie zur Marktmacht)
4	**D35**	Open-Source-Adaptionsfähigkeit + Algorithmische Expertise	"Definitiv haben auch Start-ups eine Chance. Wieso? Weil es Open-Source-Modelle gibt. Und dann musst du ein schlauer Typ sein, der die Paper gelesen hat... Und wenn du dann mit einer schlauen Idee kommst – einem Algorithmus –, dann kannst du den relativ schnell implementieren.	Know-how	Strategic	Demokratisiert Zugang	New Entrants.	Ai Creator	Periphery (ermöglicht Teilnahme)	Sensing (Wissensaneignung aus Forschung) Sensing - Identifikation von Forschungslücken
4	**D36**	Forschungskapazität + Algorithmische Expertise	"Weil niemand fundet einfach so ein Research Lab – außer, du bist schon ein Wissenschaftler wie Ilya Sutskever mit Proven Track Record, der im Prinzip die gesamte OpenAI-Science-Abteilung geleitet hat. Und der hat jetzt auch 32 Milliarden geraised, einfach nur, weil er eine eigene Idee hat, wie man besser trainieren kann."	Know-how + Financial Resources	Strategic	Symbolic Moat - Prestige und Reputation	New Entrants.	AI Giants	Core	Seizing - Reputation monetization for resource mobilization
4	**D37**	Algorithmische Expertise	„…Moat entsteht durch algorithmische Techniken und Heuristiken zur Inference-Time…“	Know-how (Algo rithmic heuristics)	Strategic	Knowlige	New Entrants, Diversifying Entrants	AI Giants, AI Creators	Core	Transforming:Kontinuierliche Verbesser ung
4	**D38**	R Forschungskapazität	„…wenn Mark Zuckerberg die Researcher aufkauft… Researcher entwickeln Algorithmen…“	Know-how durch financial resources	Strategic	Talentmarkt Talent & Reputation	Diversifying Entrants	AI Giants	Core	Seizing (Talent-Akquisition als strategische Ressource) Absorptive Capacity
4	**D39**	Cross-Industry-Allianzen	"Ich meine, man hilft sich gegenseitig. Es ist eine Symbiose. Die Verticals bieten es den (...) Endnutzern an und zahlen an das Foundational Lab. Und die wiederum haben wieder einen User an sich. Ich glaube, dieser Networking Effect ist riesig"	Networking	Strategischer	Structural Moat - Symbiose-Effekte schaffen gegenseitige Abhängigkeiten	New Entrants & Diversifying Entrants	AI Giants (Foundational Labs+Cloud platforms) mit AI Creator	Core	Sensing (Symbiose-Opportunitäten), Seizing (Wertschöpfungspartnerschaften), Transforming (Ecosystem-Co-Evolution)
6	**D4**	Prompt quality emerges from continuous hands-on use	„Der {System Propmt} kann nur entstehen, wenn du sehr gute Schlepperarbeit machst (…) die ganze Zeit das Tool selbst benutzt“	Customer Access	Strategic	Learning-based Moat (Use-embedded development)	New Entrants, AI integrator	AI Creator, AI Integator <-> End-Customer	Periphery	Transforming
4	**D40**	Long Context	„Long Context LLM’s“ herzustellennen.“	Unique Solution (Long-context arc hitecture)	Technical	Technologische Führerschaft, First-Mover-Advantage, hohe technische Barrieren	Diversifying Entrants, New Entrants	AI Giants, AI Creator	Core	n.a.
1	**D41**	Wahrnehmung von Qualität und Zuverlässigkeit in der Branche	„(…) Branding und Reputation für Data Storage und Sensor (…) – Sensor wahrscheinlich eher aus dem Sinne, (…) weil es auch eine Physical World ist. . Sensor (…) weil es eine Physical World ist (…) Safety-Frage (…) Reputation“	Brand & Reputation	Strategic	Brand-Driven Trust Moat	Incumbents	AI Gaint, AI Enabler	core	Sensing (Safety-Anforderungen), Seizing (Qualitätszertifizierungen)
1	**D42**	Kapital als Moat	". Cerebras beispielsweise versucht, AI-Accelerators zu bauen für Inference, aber es sind eben wenige Player und die GPUs sind extrem teuer. "	Financial resources	Strategic	Hohe Investitionskosten (CapEx) bedeuten: Nur kapitalstarke Akteure können diesen Layer dominieren oder überhaupt betreten.	New Entrant.	AI creator	Periphere	n.a.

1	**D43**	Financial Resources	"Die Capital Expenditures für genug GPUs, um deinen Moat durch Kapital zu bauen [...] sind exorbitant. Das schafft man nicht als kleines, mit wenig Kapital ausgestattetes Start-up"	Financial Resources for Specialized Infrastructure as a moat	Strategic Control Point	Structural Moat - Kapitalbarrieren	Incumbent	AI enabler	Core	Seizing (Kapitalallokation für Ressourcen)
1	**D44**	Strategische Partnerschaften	„Networking (…) für die Chip-Betreiber wichtig (…) Producer brauchen Enabler, Enabler wollen benutzt werden“	Networking	Strategischer	Wechselseitige Abhängigkeiten schaffen starke Bindungen und Switching-Costs	Incumbent	AI Enabler	Core	Sensing (Hardware-Software-Bedürfnisse), Seizing (Enabler-Beziehungen)
1	**D45**	Strategische Partnerschaften	„Strategische Partnerschaften mit denen, die tatsächlich die Data Center betreiben – also wie Azure oder AWS."	Networking	Strategischer	Langfristige Verträge und Integration schaffen Abhängigkeiten, aber viele Cloud-Provider vorhanden	Incumbent	AI Enabler	Core	Seizing (Partnerschaftsaufbau)
1	**D46**	Specialized Compute Access	„Access zu GPUs ist entscheidend. Beim Computer fängt alles an. Und wenn Compute teuer ist, dann ist alles teuer.“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	Marktverengung auf NVIDIA - Oligopol, CAPEX-intensiv	Incumbent GPU-Hersteller (NVIDIA)	AI enabler	Core	Resource reconfiguration Kapitalintensive Fertigung, Lieferkettenkontrolle
1	**D47**	Specialized Compute Access	„…das Erste aus meiner Sicht ist der Zugang – der Access – zu GPUs. Denn es gibt sehr wenige Anbieter von GPUs… die GPUs sind extrem teuer.“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	Marktverengung auf NVIDIA - Oligopol, CAPEX-intensiv	Incumbent GPU-Hersteller (NVIDIA)	AI enabler, (AI Trader)	Core	"Resource reconfiguration Kapitalintensive Fertigung, Lieferkettenkontrolle"
1	**D48**	Performance leadership (GPU)	„Stand jetzt ist: Wenn du Leistung willst, benutzt du NVIDIA… Access to GPUs – der läuft darüber.“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	Performance moat	Incumbent GPU-Hersteller (NVIDIA)	AI enabler	Core	Continuous chip innovation
1	**D49**	Price control via Compute	„…die, die Compute kontrollieren, kontrollieren am Ende auch den Preis für Inference.“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	Marktverengung auf NVIDIA - Oligopol, CAPEX-intensiv	Incumbent GPU-Hersteller (NVIDIA)	AI enabler, (AI Trader)	Core	Scale economics, capacity orchestration
6	**D5**	Ongoing interaction embeds tool in daily work	„nicht an einem Tag (…) durch kontinuierliches Arbeiten (…) mit dem Nutzer“	Customer Access	Strategic	Ongoing interaction embeds tool in daily work	New Entrants, AI integrator	AI Creator, AI Integator <-> End-Customer	Periphery	Sensing & Shaping customer routines
1	**D50**	Developer-Ecosystem-Lock-in	„Technical Standards – Nvidia, CUDA (…) strategischer Vorteil (…) jeder Engineer kann das“	Unique Solution	Technical	Platform Lock-in via Ecosystem Familiarity	New Entrant	AI Giant	Core	Sensing (Developer-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
1	**D51**	Proprietary framework	„GPUs sind kompliziert… man braucht gute Frameworks… NVIDIA hat im Prinzip nur ein gutes, und das ist dann fürs Training.“	Unique Solution	Technical	Technische Komplexität, einziges funktionierendes Framework	AI Giants, New Entrants	Enablemet	Core	Sensing (GPU-Komplexität), Seizing (Framework-Entwicklung)
1	**D52**	Hardware-Software-Interface	"Startups, die Compiler und Frameworks schreiben für andere Architekturen, für andere Chips... Auf der Framework-Ebene – ja. Auf der darunterliegenden Hardware-Ebene – nein."	Unique Solution	Technical	Begrenzt auf Software-Layer, Hardware-Abhängigkeit bleibt		Ai creator	Periphery (but enabling)	Sensing (Hardware-Alternativen), Seizing (Framework-Entwicklung)
1	**D53**	Demokratisieren Acess zu GPU	"Es gibt tatsächlich – das jetzt als Sidenote – viele Startups, die das attackieren wollen, weil sie erkannt haben: Der Access zu GPUs ist viel zu teuer. Sie wollen das demokratisieren und öffnen"	Unique Solution	Technical	n.a.	New Entrant	Enabler	Periphere	n.a.
5	**D54**	Prompt quality emerges from continuous hands-on use	„Der {System Propmt} kann nur entstehen, wenn du sehr gute Schlepperarbeit machst (…) die ganze Zeit das Tool selbst benutzt“	Customer Access	Strategic	Learning-based Moat (Use-embedded development)	New Entrants	AI Creator, AI Integator <-> End-Customer	Periphery	Transforming
5	**D55**	Ongoing interaction embeds tool in daily work	„nicht an einem Tag (…) durch kontinuierliches Arbeiten (…) mit dem Nutzer“	Customer Access	Strategic	Ongoing interaction embeds tool in daily work	New Entrants	AI Integator <-> End-Customer	Periphery	Sensing & Shaping customer routines
5	**D56**	Algorithmische Expertise	„…Moat entsteht durch algorithmische Techniken und Heuristiken zur Inference-Time…“	Know-how (Algorithmic heuristics)	Strategic	Knowlige	New Entrants, Diversifying Entrants	AI Giants, AI Creators, AI enabler	Core	Transforming:Kontinuierliche Verbesserung

5	**D57**	Managed Inference Service	„Google kauft lizenzierte Modelle und hostet diese auf Vertex AI und bietet dann Inference an, die viel schneller ist.“	Model Deployment Platforms / Digital Infrastrucutre	Technischer Kontrollpunkt	Deployment als Geschwindigkeit- und Performance-Faktor	Diversifying Entrant	AI Giant (google)	Core	Seizing (Optimierung durch eigene Hosting-Plattform)
5	**D58**	Developer-Community-Engagement	Offene Standards wie Python ermöglichen breite Adoption – führen aber zu Kontrollverlust. Trotzdem bleiben sie strukturell wichtig durch Netzwerkeffekte und Ausbildung.	orchestration	Strategischer	Community	New Entrants	Ai Creator, AI Giant	Core	Sensing (Community-Bedürfnisse), Seizing (Standards-Adoption), Transforming (Ecosystem-Standards)
5	**D59**	System Prompt Optimization	„der System Prompt [ist] unglaublich wichtig (…) da ist der System Prompt der Moat“	Unique Solution	Technical	Proprietäres Know-how, schwer replizierbare Optimierung	New Entrants,	AI Creators	Periphery	Sensing (User-Bedürfnisse), Seizing (Prompt-Engineering)
6	**D6**	Data	Data ist relevant für die established Foundational Labs. Und Data ist relevant für Verticals	Data	Technical	n.a.	Diversifying Entrant, New Entrant	AI Creator, AI-Giant	Periphere	n.a.
5	**D60**	Hardware-Software-Interface	"Startups, die Compiler und Frameworks schreiben für andere Architekturen, für andere Chips... Auf der Framework-Ebene – ja. Auf der darunterliegenden Hardware-Ebene – nein."	Unique Solution	Technical	Begrenzt auf Software-Layer, Hardware-Abhängigkeit bleibt	New Entrant	Ai creator	Periphery (but enabling)	Sensing (Hardware-Alternativen), Seizing (Framework-Entwicklung)
5	**D61**	Long Context	"im Bereich Coding Agents –, ist, dass bei zu langer Benutzung, bei zu langen Sessions, das LLM irgendwann keinen Output mehr generieren konnte,"	Unique Solution (Long-context arc hitecture)	Technical	"Moat durch algorithmische Techniken und Heuristiken zur Inference Time wenn die LLMs schon deplayed sind"	Diversifying Entrants, New Entrants	AI Giants, AI Creator	Periphery	n.a.
6	**D62**	Lock-in through usage credits & support	„Alle Credits hast du von denen bekommen, und jetzt bist du daran gewöhnt.“ „Was sie machen: Sie versuchen, dich reinzulocken, indem sie dir viele, viele Credits geben [...] und dann bei OpenAI bleibst.“ "Alle Credits hast du von denen bekommen, und jetzt bist du daran gewöhnt. Jetzt willst du nicht mehr switchen, und du hast den besten Customer Support. Also dadurch versuchen sie, Lock-in-Effekte zu erzielen."	Customer Access -> Workflow Lock-in integration (Thorugh financial resources)	Strategic	Lock-in through usage credits & support	Incumbents + New Entrants	(AI-Giants, enabler, AI creator) + AI Integrator	Core playern (Aber auch von Peripheren AI Integrator)	Sensing & Shaping customer routines, Co-creation with users Transforming - Kontinuierliche Anpassung der Kundenbindungsstrategien
2	**D63**	Gatekeeping-Funktion	„Customer Access (…) Betreiber von AI-Infrastructure (…) geben dir nicht einfach gute GPUs – du musst sie anfragen“	Customer Access	Strategic	Gatekeeping Moat via Resource Allocation	Enabler, Diversifying Entrants	AI-Giants	Core	Sensing (Ressourcenbedarf)
3	**D64**	Strategic acquisition to block competitor access	Die wollen nicht, dass die anderen an die Daten kommen. (…) scale AI ist eine Data labeling comapanie und die hat man aufgekauft, weil (…) damit die Daten Meta gehören und nicht OpenAI	Financial resources	Strategic	Zugangsbottleneck	Diversifying Entrant	Ai-Giants	Periphere	Seizing – durch den gezielten Kauf von Scale AI wird ein wertvoller Datenzugang gesichert.
4	**D65**	Strategic acquisition to block competitor access	Die wollen nicht, dass die anderen an die Daten kommen. (…) scale AI ist eine Data labeling comapanie und die hat man aufgekauft, weil (…) damit die Daten Meta gehören und nicht OpenAI	Financial resources	Strategic	Zugangsbottleneck	Diversifying Entrant	Ai-Giants	Periphere	Seizing – durch den gezielten Kauf von Scale AI wird ein wertvoller Datenzugang gesichert.
4	**D66**	Foundational Model Upgrades	„Inference schneller machen (…) ist schon ein Bottleneck“	Unique Solution	Technical	n.a.	Diversifying Entrants, New Entrants	AI Creator, AI Giants	Periphere	n.a.
4	**D67**	Foundational Model Upgrades	"die vertikales die gebaut werden, die Applikation die gebaut werden, werden jeden Monat besser ohne dass das Startup selbst Entwicklungsarbeit leisten muss. Sie können einfach einen Monat warten (…) sie können drei Monate warten (…) benutzen dann die neuen Modelle und deren Vertikal ist besser. (…) Sie profitieren (…) extrem dadurch, von der Competition auf der Ebene darunter (foundational model). "	Unique Solution	Technical	n.a.	Diversifying Entrants, New Entrants	AI Creator, AI Giants	Periphere	n.a.
5	**D68**	Strategic acquisition to block competitor access	Die wollen nicht, dass die anderen an die Daten kommen. (…) scale AI ist eine Data labeling comapanie und die hat man	Financial resources	Strategic	Zugangsbottleneck	Diversifying Entrant	Ai-Giants	Periphere	Seizing – durch den gezielten Kauf von Scale AI wird ein wertvoller Datenzugang gesichert.

			aufgekauft, weil (…) damit die Daten Meta gehören und nicht OpenAI							
6	**D7**	Open-Source-Adaptionsfähigkeit + Algorithmische Expertise	"Definitiv haben auch Start-ups eine Chance. Wieso? Weil es Open-Source-Modelle gibt. Und dann musst du ein schlauer Typ sein, der die Paper gelesen hat... Und wenn du dann mit einer schlauen Idee kommst – einem Algorithmus –, dann kannst du den relativ schnell implementieren.	Know-how	Strategic	Demokratisiert Zugang	New Entrants.	Ai Creator	Periphery (ermöglicht Teilnahme)	Sensing (Wissensaneignung aus Forschung) Sensing - Identifikation von Forschungslücken
6	**D8**	Cross-Industry-Allianzen	"Ich meine, man hilft sich gegenseitig. Es ist eine Symbiose. Die Verticals bieten es den (...) Endnutzern an und zahlen an das Foundational Lab. Und die wiederum haben wieder einen User an sich. Ich glaube, dieser Networking Effect ist riesig"	Networking	Strategischer	Structural Moat - Symbiose-Effekte schaffen gegenseitige Abhängigkeiten	New Entrants & Diversifying Entrants	AI Giants (Foundational Labs+Cloud platforms) mit AI Creator, Integrator	Core	Sensing (Symbiose-Opportunitäten), Seizing (Wertschöpfungspartnerschaften), Transforming (Ecosystem-Co-Evolution)
6	**D9**	Developer-Community-Engagement	Offene Standards wie Python ermöglichen breite Adoption – führen aber zu Kontrollverlust. Trotzdem bleiben sie strukturell wichtig durch Netzwerkeffekte und Ausbildung.	Networking	Strategischer	Community	New Entrants	Ai Creator, AI Giant	Core	Sensing (Community-Bedürfnisse), Seizing (Standards-Adoption), Transforming (Ecosystem-Standards)
6	**E1**	Model routing, Tiered access	„Cursor kann im Endeffekt für dich entscheiden, welches Modell es nutzt, was halt gerade günstiger oder gerade schneller ist und wird dich dann halt auch ein Tier hochsetzen, wenn du halt Geld dafür zahlst.“	Customer Access	Strategic	Gateway-Lock-in; Wechselkosten durch Interface	Start-up (Cursor)	AI integratorn Coding enabler	Periphery	Configuring access, Up-/Down-sell
4	**E2**	Model routing, Tiered access	„Cursor kann im Endeffekt für dich entscheiden, welches Modell es nutzt, was halt gerade günstiger oder gerade schneller ist und wird dich dann halt auch ein Tier hochsetzen, wenn du halt Geld dafür zahlst.“	Customer Access	Strategic	Gateway-Lock-in; Wechselkosten durch Interface	Start-up (Cursor)	AI integratorn Coding enabler	Periphery	Configuring access, Up-/Down-sell
6	**E3**	„Kunde weiß Modell nicht“	„… der B2B-Kunde … weiß ja gar nicht, welches AI-Modell genutzt wird … am Ende wird mir ja immer nur ein Output gegeben. Auch da … Orchestrierung.“	Orchestration	Strategischer Kontrollpunkt	Service-Black-Box → hohe Wechselkosten	Startup Octonomi	AI-powered Application	Periphery	Orchestrating hidden backend
6	**E4**	Entscheidungs- & Steuerhoheit von Applikationsanbietern (Octonomi)	„… ich gebe denen die Daten, ich habe aber gar kein Einfluss … Octonomi … selber entscheiden, wie ich … den nächsten Schritt gehe, weil … der AI-Agent anscheinend schlauer ist …“	Orchestration	Strategischer Kontrollpunkt	Lock-in durch Black-Box-Workflow-Steuerung	Start-up (Octonomi)	AI-powered Application	Periphery	Leveraging & Configuring (Workflow-Regeln vorgeben)
1	**E5**	Financial resources	„Geld ist alles! … musst halt gucken, dass du Geld für Rechenleistung bekommst … Meta investiert Milliarden an Geld in Speichersysteme …“	Financial resources	Strategic	CAPEX-Moat: Eigen-HW vs. Cloud-Abhängigkeit	New Entrants, Diversifying Entrant , incumbent	AI Giant, AI enabler	Core	Seizing capital for hardware
5	**E6**	Scalability	„… wenn jetzt … meine Kundenanzahl von 0 auf 10 000 sich erhöht, dass ich mit meinen AI-Strukturen … hinterher komme.“	Scalability	Strategic	Wachstumsfähigkeit als Eintrittsbarriere	New Entrants	AI Integrator	Periphery	Reconfiguring (skalierbare Architektur)
6	**F1**	Etablierte Markenidentität mit Wiedererkennungswert – Trust	"Brand und Innovation ist vor allem für fast alle AI-Consumptional Layer relevant"	Brand and reputation	Strategic	Symbolic Moats - Marke als Differenzierungsfaktor	New Entrants, Diversifying Entrants	AI Creator, Giants	Periphery	Seizing (Markenaufbau als Wettbewerbsvorteil)
2	**F10**	Proprietary Software stack	"ist der wirklich durch, dieser AI-Infrastruktur market, weil dieses CUDA System von ein NVIDA sich schon so krass etabliert hat, dass das jeder AI-Developer kann"	Unique Solution - Als Kundenzugang	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
8	**F11**	Kapitalausstattung und Investitionskraft eines Unternehmens	"sehr viel Kapital einsammeln, wie es im AI-Bereich halt immer ein Thema ist"	Financial resources	Strategic	Structural Moats - Kapitalzugang als Marktbarriere	Übergreifend (alle AI-Player benötigen Kapital)	Ai-Giants	Core	Sensing (Kapitalbedarf), Seizing (Fundraising-Strategien)
8	**F12**	Generischer Zugang: Skalierbarkeit	„Scalability [...] das allerwichtigste was jeder braucht [...] auf jede Ebene [...] übertragbar“	Scalybility	Generic Control point	n.a.	Cross-cutting	Alle Akteursgruppen	n.a.	Fähigkeit zur massenhaften Nutzerbedienung und schnelles Hochskalieren von Lösungen
8	**F13**	Standortvorteil USA, Regulierung EU	„...AI Startup [...] musst du eigentlich in den USA sein [...] krasser Wettbewerbsvorteil [...] stark gebunden an Regulation [...]“	Market Design (Institution)	Institutional	regulatorische Asymmetrie zwischen Regionen	Alle	Alle	Core	n.a.

8	**F14**	politische Regulation, EU-USA	„...krasseste Regulator kommt tatsächlich aus Seiten der Politik [...] keine Chance gegenüber US Competitoren“	Market Design (Institution)	Institutional	strukturell externer Faktor, nicht durch Unternehmen beeinflussbar	Alle	Alle	Core	n.a.
8	**F15**	Regulatorische Asymmetrie Global	„in den nächsten zehn Jahren (…) verboten ist AI zu regulieren“, „die das die ganze Geschichte stark regulieren“, „nicht verfügbar in Europa“, „keine wirklichen Competitor aus Europa“	Market Design (Institution)	Institutional	unsichtbarer Gatekeeper	Alle	Alle	Core	n.a.
8	**F16**	- Regulatorische Rahmenbedingungen:	„Regulator ein riesen Punkt [...] in der EU Perspektive mit unserem AI Gesetzen [...] stark regulieren [...] kaum Anbieter in Europa.“	Market Design (Institution)	Institutional	Strukturelle Marktbarrieren durch regulatorische Unterschiede	Alle	Alle	Übergreifend (beeinflusst Core und Periphery)	Sensing (Erkennen regulatorischer Unterschiede als Wettbewerbsfaktor)
8	**F17**	Grundlegende Fähigkeit zur modularen Systemarchitektur	„Modularität für [...] die Leute die AI Models nutzen extrem wichtig [...] konstant Backend Systeme wechseln [...] mehrere Optionen [...]“	Modularity	Generic Control point	Application Provider				Fähigkeit zur flexiblen Integration neuer Modelle und Systeme, Sicherung operativer Anpassungsfähigkeit
8	**F18**		„...momentan alles gerade offene API´s [...] kein signifikanter Kontrollpunkt [...] jeder hat Zugriff [...] Wettbewerbsnachteil wenn du beschränkst“	Orchestration	Generic		Incumbents	AI Giant		
8	**F19**	Reaktionszeit auf Veränderungen + Geschwindigkeit der Anpassung	„...extrem agil sein [...] sofort adaptieren [...] sonst macht das die Competition [...] Wettbewerbsvorteil“	Strategic Agility	Strategic	Rrforderlich in dynamischem Umfeld, aber nicht dauerhaft exklusiv	New Entrants, Diversifying Entrants	AI Creator	Core	Fähigkeit zur schnellen Reaktion auf Modellverbesserungen, Integration neuer Technologien, Anpassung an Nutzerbedarfe
6	**F2**	Training-Datensätze	"Bei spezialisierten Modells brauchst du ja da wirklich speziellen Daten die genau für diesen einen Use Case wichtig sind"	Data	Technical Control Point	Structural Moats - Proprietary Data (hochspezialisierte Domain-spezifische Daten)	New Entrants	AI Creator	Periphere	
3	**F20**	Training-Datensätze	"Google hat er ja extrem viel. Google hat komplett Google halt als Datenquelle deren ganze interne Tools auch Unternehmen, die damit arbeiten dem extrem große Bandbreite an Daten, Was langfristig zu Vorteilen führt"	Data	Technical Control Point	Proprietäre, vielfältige und nicht substituierbare Datenquellen aus vielen eigenen Kanälen	Diversifying Entrant	AI Giants	Core	Seizing (Kapitalisierung der internen Datenbestände für Foundation Models)
3	**F21**	Training-Datensätze	„...ich glaube da gewinnt jetzt noch die Quantität gegenüber der Qualität […] der Player am Markt, der dann halt genutzt wird von allen anderen“	Data	Technical Control Point		Incumbent	AI Creator, AI-Giant	Core	Fähigkeit zur schnellen Skalierung der Datenverarbeitung und -integration – Wettbewerbsvorteil durch Geschwindigkeit
3	**F22**	Training-Datensätze	"so kompens wie X oder auch Google langfristig eigentlich eine viel viel stärkere Marktposition haben, weil sie so krass viel interne Daten haben" Second-Order Theme: Data	Data	Technical Control Point	Structural Moats - Proprietary Data (massive interne Datenbestände)	Diversifying Entrant	AI Giant	Core	
3	**F23**	Training-Datensätze	"so ein Unternehmen wie OpenAI (...) hätte den krassen Nachteil langfristig, weil sie eben keine ich sag mal keine große interne Datenmenge haben von verschiedenen Channels"	Data	Technical Control Point		New Entrant	AI Creator	Periphere	Transforming (Partnerschaften wie mit Microsoft zur Datenbeschaffung)
3	**F24**	Training-Datensätze	"Bei spezialisierten Modells brauchst du ja da wirklich speziellen Daten die genau für diesen einen Use Case wichtig sind"	Data	Technical Control Point	Structural Moats - Proprietary Data (hochspezialisierte Domain-spezifische Daten)	New Entrants	AI Creator	Periphere	
3	**F25**	Training-Datensätze	„Also momentan ist der Number One Point Daten [...] vor allem Daten Quantität [...] durch eine extrem hohe Quantität an Daten.	Data	Technical	Structural Moats - Proprietary Data (exklusive Datensätze als Trainingsgrundlage)	Diversifying Entrants (implizit - große Tech-Konzerne mit Datenzugang)	AI Giant, AI Creator	Core	Data acquisition, integration Sensing (Erkennen der Bedeutung von Datenquantität für Model-Performance)
3	**F26**	Model Provenance & Training Data Quality	„Scale AI [...] haben auch ein krassen Kontrollpunkt [...] weil die von den ganzen großen Playern genutzt werden.“	Data Labeling	Technical	Da First-Mover, viele gescheiterte Versuche der Konkurrenz, schwer replizierbar, Nutzung durch Big Player	Data Service Provider	AI trader, AI Giant	Periphere	Aufbau eines effizienteren Systems mit reduziertem „Human in the loop“ – Automatisierung einer Schlüsselaktivität

3	**F27**	spezifische Kostenfaktoren: Data-Labeling, Engineering Teams, Daten-Akquisition	„...Data-labeling hat hohen Kapitalbedarf [...] viele employees [...] oder eine solution [...] teuer [...] Engineering Team [...] Daten einkaufen [...]“	Financial resources	Strategic	Structural Moats - Hohe Kapitalbarrieren für Personal und Engineering	New Entrants (Data Labeling Startups)	Ai-Giants, AI Creator	Periphere	Seizing (Kapitalmobilisierung für Personal- und Technologieaufbau)
3	**F28**	Human-in-the-Loop Reduction	„...unique solution ein bestimmter Algorithmus oder spezielles human Know-how [...] ein effizienteres System [...] weniger human in the loop“ Wenn es ein labeling Startup schaffen würde, durch (...) irgendwelche Algorithmen oder whatever dieses human in Loop Thema auf drastisches reduzieren. (...) dann wäre das meiner Meinung nach starker Kontrollpunkt. (...) das wäre dann so ein klassischer First Mover Adventage, denn keiner wirklich replizieren kann"	Unique Solution	Technical	Algorithmische Innovation, schwer replizierbare Automatisierung	New Entrants (	AI Creators	Core	Sensing (Automatisierungs-Potenzial), Seizing (Algorithmus-Entwicklung), Transforming (Prozess-Innovation)
3	**F29**	Training-Datensätze	Zum Beispiel hast du so ein Lungen CT Algorithmus der auf Tumor Erkrankung im Lungengewebe testet. Da hast du halt nur diesen einen Usecase. Mehr kannst du damit nicht machen"	Unique Solution through data. ---> Agility	Technical Control Point	Structural Moats - Domain-spezifische Expertise und Algorithmen	New Entrants	AI Taker	Periphere	
6	**F3**	Medizinische Evidenz, Regulatorik	„...Evidenz haben [...] das ist ja in der Medizin vor allem großes Thema [...] legal, auch schon regulatorisch gesehen“	Market Design (Institution)	Institutional	egulatorisch geschützt, nur wenige zugelassene Modelle nutzbar	Alle	Alle	Periphere	n.a.
4	**F30**	Training-Datensätze	"Google hat er ja extrem viel. Google hat komplett Google halt als Datenquelle deren ganze interne Tools auch Unternehmen, die damit arbeiten dem extrem große Bandbreite an Daten, Was langfristig zu Vorteilen führt"	Data	Technical Control Point	Proprietäre, vielfältige und nicht substituierbare Datenquellen aus vielen eigenen Kanälen	Diversifying Entrant	AI Giants	Core	Seizing (Kapitalisierung der internen Datenbestände für Foundation Models)
4	**F31**	Training-Datensätze	„...ich glaube da gewinnt jetzt noch die Quantität gegenüber der Qualität […] der Player am Markt, der dann halt genutzt wird von allen anderen“	Data	Technical Control Point		Incumbent	AI Creator, AI-Giant	Core	Fähigkeit zur schnellen Skalierung der Datenverarbeitung und -integration – Wettbewerbsvorteil durch Geschwindigkeit
4	**F32**	Training-Datensätze	"so ein Unternehmen wie OpenAI (...) hätte den krassen Nachteil langfristig, weil sie eben keine ich sag mal keine große interne Datenmenge haben von verschiedenen Channels"	Data	Technical Control Point		New Entrant	AI Creator	Periphere	Transforming (Partnerschaften wie mit Microsoft zur Datenbeschaffung)
4	**F33**	Training-Datensätze	„Also momentan ist der Number One Point Daten [...] vor allem Daten Quantität [...] durch eine extrem hohe Quantität an Daten.	Data	Technical	Structural Moats - Proprietary Data (exklusive Datensätze als Trainingsgrundlage)	Diversifying Entrants (implizit - große Tech-Konzerne mit Datenzugang)	AI Giant, AI Creator	Core	Data acquisition, integration Sensing (Erkennen der Bedeutung von Datenquantität für Model-Performance)
4	**F34**	Kapital als Moat	"kein Model von scratch selber bauen, das wird nicht funktioniert, es sei denn du hast wirklich mehrere Milliarden an Kapital und selbst da hast wahrscheinlich keine Chance mehr das Race ist schon so gut wie vorbei. Die Player sind schon etabliert"	Financial resources	Strategic	Fianncial Moat	Enabler, Diversifying Entrants	Ai-Giants	Core	n.a.
4	**F35**	spezifische Kostenfaktoren: Data-Labeling, Engineering Teams, Daten-Akquisition	„...Data-labeling hat hohen Kapitalbedarf [...] viele employees [...] oder eine solution [...] teuer [...] Engineering Team [...] Daten einkaufen [...]“	Financial resources	Strategic	Structural Moats - Hohe Kapitalbarrieren für Personal und Engineering	New Entrants (Data Labeling Startups)	Ai-Giants, AI Creator	Periphere	Seizing (Kapitalmobilisierung für Personal- und Technologieaufbau)
4	**F36**	Kapitalausstattung und Investitionskraft eines Unternehmens + [Neuer Code] Capital-Intensity für AI-Infrastructure	„...mehrere Milliarden an funding [...] enorme Menge Daten [...] enorme Rechenpower [...] sonst bringt das überhaupt nichts“	Financial resources	Strategic	Extreme Eintrittsbarrieren (Kapital, Daten, Compute)	Enabler, Diversifying Entrants	Ai-Giants	Core	Sensing (Scale-Anforderungen), Seizing (Massive Kapitalallokation), Transforming (Infrastructure-Aufbau)

4	**F37**	Forschungskapazität	„...die Besten der Besten Developer [...] 100 Millionen Bonus [...] die innovativsten Ideen [...] wer das beste Talent hat, der gewinnt“	Know-how / Talent	Strategic	Hoch – schwer substituierbar, hohe Bindungskosten, kreativer Wettbewerbsvorteil	New Entrants.	AI Giants, AI Creators	Core	Fähigkeit zur Entwicklung neuer Modellarchitekturen; Wissensträger für Differenzierung und technologische Führung
4	**F38**	Geschwindigkeit der Anpassung + Schnelle Marktdurchdringung	„...nah am research bleiben [...] modular agiert [...] Optionen offen hält [...] nicht nur auf eine Sache ausrichtet“	Strategic Agility	Strategic	n.a.	Diversity Entrants, Enabler	AI Giants, AI Creator	Core	Fähigkeit zur Weiterentwicklung basierend auf wissenschaftlichem Fortschritt und architekturbezogener Anpassungsfähigkeit
4	**F39**	Geschwindigkeit der Anpassung + Schnelle Marktdurchdringung	"wenn zum Beispiel jetzt Google, open-ai oder so jetzt irgendwie eine krass geile neue Infrastruktur, wie jetzt zum Beispiel was früher halt von Google entwickelt, diese Transformers Architektur auf der das eigentlich alles passiert, wenn sowas wieder passieren würde dann wäre auch die Agilität bei diesen Foundation Models extrem wichtig"	Strategic Agility	Strategic	n.a.	Diversity Entrants, Enabler	AI Giants, AI Creator	Periphery	Sensing (Infrastructure Innovation), Seizing (Rapid Deployment), Transforming (Architecture Evolution)
6	**F4**	Reaktionszeit auf Veränderungen	"irgendwelche ai Startups, die einfach nur so ein GPT Layer quasi haben, wovon ist ja wirklich Sand am Meer gibt. Die machen alles gleiche und die müssen halt extrem agil sein, wenn da ein neues Model kommt, müssen Sie sofort adaptieren, weil sonst macht das die Competition"	Strategic Agility	Strategic	Structural Moats - Startups abhängig von API-Änderungen	New Entrants	AI Creator	Periphery	Transforming (Zwang zur permanenten Anpassung)
4	**F40**	Proprietary Software Stack	„...wenn [...] OpenAI [...] neue Infrastruktur entwickelt [...] Wettbewerbsvorteil [...] in-house haben“	Unique Solution	Technical	n.a.	Foundational Model Provider	New Entrant	AI Giant	Seizing (In-House-Entwicklung),
1	**F41**	Kapitalausstattung und Investitionskraft eines Unternehmens + [Neuer Code] Capital-Intensity für AI-Infrastructure	„...mehrere Milliarden an funding [...] enorme Menge Daten [...] enorme Rechenpower [...] sonst bringt das überhaupt nichts“	Financial resources	Strategic	Extreme Eintrittsbarrieren (Kapital, Daten, Compute)	Enabler, Diversifying Entrants	Ai-Giants	Core	Sensing (Scale-Anforderungen), Seizing (Massive Kapitalallokation), Transforming (Infrastructure-Aufbau)
1	**F42**	CUDA Infrastruktur, NVIDIA-Monopol	„NVIDIA momentan eigentlich so ein kleines Monopol hat, wegen deren CUDA Infrastruktur [...] kein anderer Anbieter wirklich replizieren kann.“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	proprietäre Plattform, schwer substituierbar	Incumbent	AI Giant / Enabler	Core	Plattform-Kontrolle, First-Mover-Vorteil
1	**F43**	Specialized AI Hardware	„...CUDA Infrastruktur [...] sehr nützlich [...] rechenstark [...] monopolistische Stellung im Markt [...] alle nutzen Nvidia Chips“	Specialized AI Hardware (Digital Infrastructure)	Technical Control Point	-	Incumbent	AI Giant / Enabler	Core	Ressourcenkonfiguration, Technologie-nutzung
1	**F44**	Geschwindigkeit der Anpassung + Schnelle Marktdurchdringung	"wenn zum Beispiel jetzt Google, open-ai oder so jetzt irgendwie eine krass geile neue Infrastruktur, wie jetzt zum Beispiel was früher halt von Google entwickelt, diese Transformers Architektur auf der das eigentlich alles passiert, wenn sowas wieder passieren würde dann wäre auch die Agilität bei diesen Foundation Models extrem wichtig"	Strategic Agility	Strategic	n.a.	Diversity Entrants, Enabler	AI giants.	Periphery	Sensing (Infrastructure Innovation), Seizing (Rapid Deployment), Transforming (Architecture Evolution)
1	**F45**	Proprietary Software stack	„...CUDA System von NVIDIA [...] krass etabliert [...] jeder nutzt es [...] jedes große Foundation Model [...] jeder AI Engineer muss es können [...]“	Unique Solution	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
1	**F46**	Proprietary Software stack	„CUDA ist gratis […] Deren ganzes Ding ist Developer-Focus.“	Unique Solution	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
1	**F47**	Proprietary Software stack	"ist der wirklich durch, dieser AI-Infrastruktur market, weil dieses CUDA System von ein NVIDA sich schon so krass etabliert hat, dass das jeder AI-Developer kann"	Unique Solution	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
5	**F48**	spezifische Kostenfaktoren: Data-Labeling, Engineering Teams, Daten-Akquisition	„...Data-labeling hat hohen Kapitalbedarf [...] viele employees [...] oder eine solution [...] teuer [...] Engineering Team [...] Daten einkaufen [...]“	Financial resources	Strategic	Structural Moats - Hohe Kapitalbarrieren für Personal und Engineering	New Entrants (Data Labeling Startups)	Ai-Giants, AI Creator	Periphere	Seizing (Kapitalmobilisierung für Personal- und Technologieaufbau)

5	**F49**	Forschungskapazität	„...die Besten der Besten Developer [...] 100 Millionen Bonus [...] die innovativsten Ideen [...] wer das beste Talent hat, der gewinnt“	Know-how / Talent	Strategic	Hoch – schwer substituierbar, hohe Bindungskosten, kreativer Wettbewerbsvorteil	New Entrants.	AI Giants, AI Creators, AI enabler	Core	Fähigkeit zur Entwicklung neuer Modellarchitekturen; Wissensträger für Differenzierung und technologische Führung
6	**F5**	Foundational Model Upgrades	"Agilität sehe ich vor allem halt letztendlich bei den wirklichen Nutzern von diesen oder ja, die die foundational Models nutzen die Leute seien sie jetzt irgendwelche ai Startups, die einfach nur so ein GPT Layer quasi haben (...) Die machen alles gleiche und die müssen halt extrem agil sein, wenn da ein neues Model kommt, müssen Sie sofort adaptieren"	Unique Solution -> Agility	Technichal	n.a.	New Entrant	AI Creator	Periphere	n.a.
5	**F50**	Geschwindigkeit der Anpassung + Schnelle Marktdurchdringung	„...nah am research bleiben [...] modular agiert [...] Optionen offen hält [...] nicht nur auf eine Sache ausrichtet“	Strategic Agility	Strategic	n.a.	Diversity Entrants, Enabler	AI Giants, AI Creator	Core	Fähigkeit zur Weiterentwicklung basierend auf wissenschaftlichem Fortschritt und architekturbezogener Anpassungsfähigkeit
5	**F51**	Human-in-the-Loop Reduction	„...unique solution ein bestimmter Algorithmus oder spezielles human Know-how [...] ein effizienteres System [...] weniger human in the loop“ Wenn es ein labeling Startup schaffen würde, durch (...) irgendwelche Algorithmen oder whatever dieses human in Loop Thema auf drastisches reduzieren. (...) dann wäre das meiner Meinung nach starker Kontrollpunkt. (...) das wäre dann so ein klassischer First Mover Adventage, denn keiner wirklich replizieren kann"	Unique Solution	Technical	Algorithmische Innovation, schwer replizierbare Automatisierung	New Entrants (	AI Creators	Core	Sensing (Automatisierungs-Potenzial), Seizing (Algorithmus-Entwicklung), Transforming (Prozess-Innovation)
5	**F52**	Fine-Tuning + UI Integration	"dass du so ein Foundation Model nimmst und das wirklich fine-Tunes"	Unique Solution	Technical	Technische Expertise, spezialisierte Toolchains	New Entrants,	AI Creator	Periphere	Sensing (Model-Anforderungen), Seizing (Fine-Tuning-Expertise)
5	**F53**	Foundational Model Upgrades	"Agilität sehe ich vor allem halt letztendlich bei den wirklichen Nutzern von diesen oder ja, die die foundational Models nutzen die Leute seien sie jetzt irgendwelche ai Startups, die einfach nur so ein GPT Layer quasi haben (...) Die machen alles gleiche und die müssen halt extrem agil sein, wenn da ein neues Model kommt, müssen Sie sofort adaptieren"	Unique Solution -> Agility	Technichal	n.a.	New Entrant	AI Creator	Periphere	n.a.
6	**F54**	Direkter Zugang zu Endkunden und Kontrolle über Kundenbeziehungen	„...eine einfache UI mit das wichtigste [...] eine easy solution [...] die jeder nutzen kann [...] auch wenn es ein 80-jähriger Radiologe ist“	Customer Access	Strategic	UX kann repliziert werden, aber Kombination mit Domain-Tailoring erschwert Imitation	New Entrants, Diversifying Entrants	AI Creator, AI giants	Core	Fähigkeit zur Nutzerzentrierung, Domänenintegration und bedarfsgerechter Interaktion mit komplexen Modellen
6	**F6**	Training-Datensätze	Zum Beispiel hast du so ein Lungen CT Algorithmus der auf Tumor Erkrankung im Lungengewebe testet. Da hast du halt nur diesen einen Usecase. Mehr kannst du damit nicht machen"	Unique Solution through data	Technical Control Point	Structural Moats - Domain-spezifische Expertise und Algorithmen	New Entrants	AI Taker	Periphere	
2	**F7**	General Compute & Cloud Backbone	„Nummer 2 […] ist halt die Rechenpower [...] Meta hatte […] Rechenzentren, die […] riesengroß sind [...] extrem teuer.“	Digital Infrastructure	Technichal	Structural Moats - Infrastructure Control (Besitz/Kontrolle von Rechenzentren)	Diversifying Entrant (Meta)	AI Giant	Core	Infrastructure building Seizing (Mobilisierung von Ressourcen für Rechenzentren-Ausbau)
2	**F8**	Proprietary Software stack	„...CUDA System von NVIDIA [...] krass etabliert [...] jeder nutzt es [...] jedes große Foundation Model [...] jeder AI Engineer muss es können [...]“	Unique Solution - Als Kundenzugang	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
2	**F9**	Proprietary Software stack	„CUDA ist gratis […] Deren ganzes Ding ist Developer-Focus.“	Unique Solution - Als Kundenzugang	Technichal	Network-Effekte durch Developer-Adoption, hohe Switching-Costs, De-facto-Standard-Position	Diversifying Entrants	AI Giant	Core	Sensing (Markt-Bedürfnisse), Seizing (Standard-Etablierung), Transforming (Ecosystem-Aufbau)
5	**G1**	Multi-Tool Integration	„…wir… müssen verschiedene AI-Tools zusammenbringen… und das für unsere Kunden orchestrieren.“	Orchestration	Strategic	Integration-Know-how	New Entrant	AI Integrator	Periphery	Sensing (Customer); Seizing (Integration)

6	**H1**	Einbindung Enterprise-Stacks	„…Networking… durch Einbindung in bestehende Enterprise-Stacks.“	Networking	Strategic	Depth-of-integration	New Entrant	AI Integrator	Core	Seizing (Partnerships)
5	**H10**	GPU-Orchestration	„…Companies wie Run:ai… machen spezialisierte Orchestration für GPU-Scheduling…“	Orchestration	Technical	Tech-Expertise	Incumbent, New Entrant	AI Enabler	Periphery	Sensing (Resource Opt.); Seizing (Tool)
5	**H11**	Eigene ML-Pipeline	„…wir als Creator müssen halt auch unsere eigenen ML-Pipelines orchestrieren können…“	Orchestration	Technical	Operational Excellence	New Entrant	AI Creator	Periphery	Sensing (Pipeline); Seizing (Automation)
6	**H2**	White-Label & CRM	„…über White-Label-Lösungen und CRM-Bundling… verkauft ihm eine complete Solution.“	Customer Access	Strategic	Client Lock-in	New Entrant	AI Integrator	Core	Seizing (Bundling)
6	**H3**	Brand-Power Copilot	„…Schau dir Microsoft an mit Copilot – die nutzen halt ihre bestehende Office-Nutzerbasis…“	Brand	Strategic	Brand-loyalty	Incumbent	AI Giant	Core	Seizing (Brand Monetization)
6	**H4**	Monetarisierung Bestandskunden	„…bestehende Nutzerbasis monetarisieren…“	Customer Access	Strategic	Installed base	Incumbent	AI Giant	Core	Seizing (Cross-Selling)
6	**H5**	Plattform-Orchestration	„…Giants… orchestrieren verschiedene Anwendungen in ihren Plattform-Ökosystemen.“	Orchestration	Strategic	Ecosystem lock-in	Incumbent	AI Giant	Core	Transforming (Ecosystem)
6	**H6**	Kontinuierliche Interaktionsdaten	„…sammeln halt kontinuierlich User-Feedback-Daten und Interaktionsdaten…“	Data	Technical	Data network effects	Incumbent	AI Giant	Core	Learning Loops
4	**H7**	Komplette Kontrolle Endkundenzugang	„…die kontrollieren auch komplett den Zugang zu den Endkunden. Das ist ein krasser Moat…“	Customer Access	Strategic	Network effects & installed base	Incumbent	AI Giants	Core	Sensing (User Needs); Seizing (Platform Control)
4	**H8**	Kundenzugang-Herausforderung Creator	„…als Creator musst du halt andere Wege finden…, um überhaupt Customer Access zu bekommen.“	Customer Access	Strategic	Partner-abhängigkeit	New Entrant	AI Creator	Periphery	Sensing (Nischen); Seizing (Partnerships)
5	**H9**	Full-Stack ML-Lifecycle	„…die haben halt ihre eigenen MLOps Plattformen – Azure ML, Vertex AI… Da geht es voll um Orchestration, weil die halt das ganze ML-Lifecycle managen…“	Orchestration	Strategic	Plattform-Integration	Incumbent	AI Giants	Core	Sensing/Seizing/Transforming
6	**I1**	Modularity, Customer Access, Brand, Agility	„...wir haben [...] modularity, Customer Access [...] Brand und Agility [...] wichtigste [...]“	Agility	Strategic Control Points	Mittel – auf spezifische Nutzergruppen zugeschnitten	Startups, Incumbents	AI-powered Operator	Periphery	Reconfiguring & Sensing (UX, Marktanpassung)
4	**I10**	Data Access, Use Case Relevance	„...Worauf basieren diese ganzen Models? Data [...] Zugang zu Data [...] reasoning, Use Cases“	Data	Strategic Control Point	Hoch – Daten als Trainings- und Anwendungsgrundlage	AI Creators, AI-powered Operators	Creator + Operator	Core	Learning (Datennutzung für Modell & Use Cases)
4	**I11**	Reinforcement Learning Loop, Data Feedback	„...sobald du das reasoning trainiert hast [...] reinforcement learning [...] Netzwerk Effekt [...] brauchst du die Hoheit über Daten“	Data	Submechanism	Mittel – Voraussetzung: Feedback-Zugang	AI Creators	Creator	Core	Learning (Datenrückführung)
1	**I12**	Agilität, Orchestration	„Agilität. Okay? und vielleicht auch Orchestration [...] weil du wirst als neuer Player kannst du ja nicht den ganzen Chip selber bauen.“	Agility	Submechanism	Mittel – abhängig vom Partner-Setup	Start-ups	Enabler	Periphery → Core (bei starker Kombination)	Orchestrating (Partner konfigurieren, bündeln)
1	**I13**	Unique Solution, Know-how, Capital	„Unique Solution, Know-how, Financial Resources [...] Infrastruktur-Ebene“	Financial Ressources	Technischer + Strategischer CP (kombiniert)	Hoch – Moat-Kombination	Start-ups + Incumbents	Enabler, Creator	Core	Seizing (Innovation + Kapitalbündelung)
1	**I14**	Unique Solution, Know-how, Capital	„Unique Solution, Know-how, Financial Resources [...] Infrastruktur-Ebene“	Know-How	Technischer + Strategischer CP (kombiniert)	Hoch – Moat-Kombination	New Entrants, Diversifying Entrant , incumbent	Enabler, Creator	Core	Seizing (Innovation + Kapitalbündelung)
1	**I15**	Zugang zu Entwickler-Stack für neue Technologien	„Playbook: kostenfreier Zugang, wie CUDA für neue Architekturen“	Unique Solution	Submechanism	Mittel – abhängig vom Adoptionsgrad	Start-ups	Enabler	Periphery → Core (bei Adoption)	Configuring (Standards etablieren)
1	**I16**	Disruptive Compute Architecture	„Photonics, Quantum Computing [...] disruptive gegenüber GPU [...] Kunden nutzen = pot. Aufbruch des Monopols“	Unique Solution	Technischer Kandidat	Unklar – hängt vom Standard & Ökosystem ab	Start-ups	Enabler	Potenziell Core	Sensing + Seizing (Disruption & Marktöffnung)
1	**I17**	Unique Solution, Know-how, Capital	„Unique Solution, Know-how, Financial Resources [...] Infrastruktur-Ebene“	Unique Solution	Technischer + Strategischer CP (kombiniert)	Hoch – Moat-Kombination	Start-ups + Incumbents	Enabler, Creator	Core	Seizing (Innovation + Kapitalbündelung)
6	**I2**	Incumbents haben Brand & Access, Startups Agility	„...du als Incumbent [...] schon Customer Access [...] Brand [...] Startup muss auf andere Punkte achten [...] Agility [...] Pivoten [...] schnell reagieren“	Agility	Strategic Control Point	Mittel – Reaktionsgeschwindigkeit & Marktadaption	Startups vs. Incumbents	AI-powered Operator	Periphery	Sensing & Seizing (Pivoting, Fast Iteration)

6	**I3**	Modularity, Customer Access, Brand, Agility	„...wir haben [...] modularity, Customer Access [...] Brand und Agility [...] wichtigste [...]“	Brand	Strategic Control Points	Mittel – auf spezifische Nutzergruppen zugeschnitten	Startups, Incumbents	AI-powered Operator, AI giant	Periphery	Reconfiguring & Sensing (UX, Marktanpassung)
6	**I4**	Modularity, Customer Access, Brand, Agility	„...wir haben [...] modularity, Customer Access [...] Brand und Agility [...] wichtigste [...]“	Customer Access	Strategic Control Points	Mittel – auf spezifische Nutzergruppen zugeschnitten	Startups, Incumbents	AI-powered Operator	Periphery	Reconfiguring & Sensing (UX, Marktanpassung)
6	**I5**	Brand im Vergleich	„(Brand) Ist natürlich immer wichtig, aber jetzt weniger als in anderer Bereichen würde ich sagen.“	Customer Access (sub)	Submechanism	Gering – Marke weniger differenzierend	Start-ups	AI Trader / Application	Periphery	Sensing (Markenaufbau, falls nötig)
6	**I6**	Data Access, Use Case Relevance	„...Worauf basieren diese ganzen Models? Data [...] Zugang zu Data [...] reasoning, Use Cases“	Data	Strategic Control Point	Hoch – Daten als Trainings- und Anwendungsgrundlage	AI Creators, AI-powered Operators	Creator + Operator	Core	Learning (Datennutzung für Modell & Use Cases)
6	**I7**	Modularity, Customer Access, Brand, Agility	„...wir haben [...] modularity, Customer Access [...] Brand und Agility [...] wichtigste [...]“	Modularity	Strategic Control Points	Mittel – auf spezifische Nutzergruppen zugeschnitten	Startups, Incumbents	AI-powered Operator	Periphery	Reconfiguring & Sensing (UX, Marktanpassung)
2	**I8**	CUDA, Proprietary Access	„letztlich codest du halt in Cuda [...] nur für NVIDIA Chips [...] nicht für Intel“	Customer Access	Strategic Control Point	Hoch – Vendor Lock-in durch Software-Gatekeeping	AI Enabler (NVIDIA)	Enabler	Core	Seizing + Configuring (Zugang + Standard definieren)
2	**I9**	Zugangskontrolle zu Daten, Crawling-Management	„...Cloudflare [...] Webseiten absichern [...] vor Crawlern schützen [...] wer kriegt Zugang zu diesen Daten [...] Kontrolle durch Kunden“	Daten	Strategic Control Point	Mittel – Intermediär-Kontrolle über Datenzugang	AI Enabler (Cloudflare)	Infrastructure Layer – Gateway zu Data Training & Inference	Core	Configuring (Data Flow Governance durch Kunden)

Appendix C: Software and Digital Tools Used

The following software and digital tools were used throughout the development and completion of this thesis:

- **Microsoft Word (Mac version, 2025):**
  Used for writing, formatting, and managing automatic tables of contents, figures, and tables, as well as citations and footnotes.
- **Microsoft Excel:**
  Applied for organizing and analyzing quantitative data and for creating supporting tables.
- **PowerPoint:**
  Used for designing figures and diagrams included in the thesis.
- **ChatGPT (GPT-4, OpenAI, accessed July 2025):**
  Used as a support tool to improve the structure of the thesis, refine argumentation, and correct grammar and language style. All content was critically reviewed and independently written by the author.
- **Perplexity AI:**
  Utilized for idea development and for obtaining structural guidance during the writing process. No external content was adopted without verification.
- **Zoom and Microsoft Teams:**
  Used for online meetings, discussions, and consultations throughout the research and writing phases.
- **Notta and Apple Voice Memos (Transcription features):**
  Employed to transcribe spoken notes and meeting discussions into text format.
- **DeepL Translator:**
  Used to support translation of specific passages from German to English, with manual verification and editing by the author.