Appification in the Age of AI

Exploring AI App Cultures and Economies

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ASI Sprint Report
May 2025

app studies
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The App Studies Initiative (ASI) is an international research network comprising academic experts in app-related media research who contribute to the study of apps and platforms. The research network involves researchers and faculty from the University of Amsterdam and Utrecht University (the Netherlands), the University of Warwick and Goldsmiths, University of London (United Kingdom), Concordia University and the University of Toronto (Canada), among others. Its directors are Anne Helmond, David Nieborg, Fernando van der Vlist, and Esther Weltevrede.

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About this Report

The ASI Sprint Report Series serves as a conduit for exploring the phenomenon of 'appification' and its various societal, cultural, and political-economic impacts worldwide. Dedicated to critical app studies inquiry, this series showcases ongoing research efforts conducted by researchers associated with the App Studies Initiative (ASI) in collaboration with Master's students. Published by the ASI, each report features the latest research generated during recent 'sprints', with the aim of disseminating ongoing research within the broader app and platform studies research community.

This second ASI Sprint Report stems from the 2024–2025 Master's elective course 'Appification: The Cultures and Economies of Apps', and the Cultural Data & AI Master's Embedded Research Project 'The Appification of AI: Exploring Emerging AI App Ecosystems and Infrastructures', both developed, taught, and supervised by the editors in the Department of Media Studies at the University of Amsterdam, Faculty of Humanities. The chapters present the research undertaken by students as part of the Embedded Research Project and the course's concluding themed 'data sprint', organised within the Department of Media Studies. All contributors are listed in the Contributors section of the report.

1 Editorial Introduction

Appification in the Age of AI

Fernando van der Vlist · Esther Weltevrede

Abstract

As artificial intelligence (AI) becomes increasingly integrated into everyday life and digital environments, its presence in applications ('apps') warrants closer examination. This report explores what we call the 'appification of AI'—the process by which AI technologies are embedded into daily life and practices via apps and app ecosystems. Drawing on insights from app studies, platform studies, and critical AI studies, the report investigates how different kinds of AI apps and app ecosystems—whether marketed as applications, 'agents', 'solutions', 'custom models', 'GPTs', or other forms—are shaping user experiences, business models, and digital infrastructures. It maps the rapidly expanding landscape of AI apps across multiple spheres, from generative AI mobile apps and chatbots like OpenAI's ChatGPT to enterprise-focused AI tools distributed through cloud AI marketplaces. Combining app ecosystem analysis and a 'multi-situated' approach to app studies and collaborating with Master's students, the report presents a series of mappings and case studies that highlight how AI apps are reshaping different sectors and spheres of everyday life. Ultimately, the report underscores the significance of critical app and platform studies in understanding the cultural, economic, and political dimensions of AI technology across various application contexts and cases.

Keywords: appification · app studies · artificial intelligence (AI) · app ecosystems · app stores · mobile apps · AI app cultures · political economy · data-sprinting

Referenced Actors: Agentforce · AI Agent Space · Alexa · Amazon · Amazon Web Services · Andreessen Horowitz · Anthropic · App Store · App Studies Initiative · Apple · Apple

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Intelligence · Appification: The Cultures and Economies of Apps · AWS Marketplace · ChatGPT · ChatGPT API · Claude · Copilot · Data.ai · Deepseek · Digital Methods Summer and Winter Schools · Echo · Gemini · Gojek · Google · Google Cloud · Google Cloud Marketplace · Google Play · Grok · Hugging Face · HuggingChat · Humanities Labs · Joule AI Agents · LAB42 · Master's Cultural Data & AI · Microsoft · Microsoft 365 · Microsoft Azure · Microsoft Azure Marketplace · Nova · OpenAI · Perplexity · Realtime API · Replika · Responses API · Salesforce · SAP · Sensor Tower · University of Amsterdam · WeChat

Introduction: Emerging AI App Cultures and Economies

How can app studies—and the 'appification' concept—help us understand the current development, emerging cultures, and economies of artificial intelligence (AI)?

November 30, 2024, marked the second anniversary of OpenAI's launch of ChatGPT. While not the first of its kind, since its debut, AI applications ('apps') have experienced significant advancements, reflecting AI's rapid integration into various technologies and daily life. Also in late 2024, Google launched Gemini 2.0, an advanced AI model capable of generating audio and images, marking a leap in multimodal AI capabilities. This development paves the way for 'agentic' (agent-based) AI applications, including autonomous web navigation and code debugging tools (Pichai et al., 2024; Pierce, 2024; Zeff, 2025a). Apple has similarly pitched Apple Intelligence ('AI for the rest of us') in iOS 18, embedding AI seamlessly across iPhones, Macs, and other devices (Davis, 2024; Perez, 2024b). Meanwhile, Amazon introduced its Nova AI models, designed to enhance user experiences across (voice AI) services such as Alexa and Echo devices (Peters, 2024). OpenAI has also contributed to the emerging AI application landscape with its Realtime API, enabling near-instantaneous speech-to-speech experiences (Zeff, 2024). These developments highlight a broader industry trend: major technology companies are embedding increasingly sophisticated AI models into their core products and services, reshaping user interactions and setting new standards for technological innovation.

Over the past two decades, software apps have become central to culture and the economy, influencing daily routines worldwide. Academic discussions on mobile apps, their infrastructures, and the 'appification' of everyday life highlight how apps have transformed communication, access to information, payment methods, and digital services (Dieter et al., 2019; Dieter et al., 2021; Gerlitz et al., 2019a; Goggin, 2021; Miller and Matviyenko, 2014; Morris and Murray, 2018; Steinberg et al., 2022; Van der Vlist et al., 2024b). As analytics firms like Data.ai track annual global app downloads and expenditures, the shift toward mobile-first media consumption and production becomes increasingly evident. App stores play a crucial

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role in shaping global app cultures and economies, serving as primary gateways or entry points for distribution, monetisation, and discovery (Dieter et al., 2019; Van der Vlist et al., 2024a).

Against this backdrop, AI is now rapidly becoming an integral part of digital life, accelerating transformations in industries and altering how we communicate, work, and interact with technology. The incorporation of AI into software apps—what we term the 'appification of AI'—marks a shift not only in how AI technologies are deployed, embedding them into a growing range of applications and supporting expansive app ecosystems (Van der Vlist et al., 2025a: 21–24), but also in how AI *interfaces* and *interacts with* end-consumers, industries, business, and developers. Apps are increasingly acting as the point of contact between complex AI systems and everyday practices across various aspects of life. This perspective highlights how users, knowingly or unknowingly, engage with AI technologies as they become integrated into digital routines. Developers use apps as platforms to integrate, extend, innovate, and market AI capabilities. Enterprises primarily use AI to transform workflows, drive efficiencies, and create novel business models. This trend has gained momentum due to both rapid advancements in AI and its increasing accessibility for developers, businesses, and end-consumers alike (Van der Vlist et al., 2024a).

A key example is OpenAI's ChatGPT, which has not only popularised AI but also expanded its application domains, positioning AI as a foundational technology across industries and daily life. Similar initiatives from Microsoft (Copilot), Google (Gemini, initially named Bard), Anthropic (Claude), Perplexity, Hugging Face (HuggingChat) reinforce this trend, with conversational ('natural language') user interfaces—especially chatbots—emerging as the first 'killer app' for AI platforms. Meanwhile, the rise of generative AI tools has led to an influx of AI apps across app stores, a trend accelerated by OpenAI's release of the ChatGPT API in March 2023.

This report investigates the ongoing appification of AI by mapping the emerging landscape of AI-powered applications and analysing how it unfolds across different spheres, industry sectors, and levels of analysis. Through app ecosystem analysis (Van der Vlist et al.; Van der Vlist et al., 2024a) and a 'multi-situated' approach (Dieter et al., 2019), we examine AI's cultural, economic, and political dimensions through case studies and collaborative research with our Master's students, including embedded student research assistants.

App Studies meet Critical Platform and AI Studies

The Concept of Appification

The concept of 'appification' refers to the process through which aspects of daily life—from communication and information access to financial transactions and social interactions—are translated into the language and logic of mobile applications. Scholars in app studies have examined how apps, as forms of 'mundane software', introduce the datafication and formalisation of previously amorphous social practices (Dieter et al., 2019; Gerlitz et al., 2019a; Goggin, 2021; Morris and Murray, 2018; Van der Vlist et al., 2024b; Weltevrede and Jansen, 2019). In many global contexts, especially in non-Western regions, 'super apps' such as WeChat (China) and Gojek (Indonesia) consolidate multiple services within a single platform, shaping everyday practices (Steinberg et al., 2022; Van der Vlist et al., 2024b). Moreover, super apps—much like AI apps, as we contend—uniquely challenge a categorical separation between apps and platforms, emphasising the strategic dynamics involved and the necessity for case-by-case empirical analysis to ground this distinction (Van der Vlist et al., 2024b; cf. Van der Vlist, 2022).

An important aspect of appification is its 'dual-layered' nature' (Burton and Weltevrede). On one level, apps reformat everyday interactions into discrete, embodied actions—such as swiping, tapping, or scrolling—that reflect new action grammars, associated practices, and cultures of use (Gerlitz et al., 2019b). These gestures are not merely functional; they shape how users experience and internalise their routines, effectively serving as interfaces through which AI and digital technologies are integrated into daily life. As Morris and Murray (2018: 3) observe, appification marks 'a historically specific moment when an increasing number of everyday activities and routines are being expressed through, carried out by, and experienced as apps'.

At the same time, these embodied interactions are systematically transformed into data and processed within underlying infrastructures. This infrastructural dimension of appification is critical for understanding the full scope of the phenomenon. While the 'front-end' processes capture the immediate, sensory engagement of users with digital systems, the 'back-end' infrastructures—comprising e.g. advertising platforms, content delivery networks, data analytics systems, and software development kits (SDKs)—repackage these interactions into formats that can be redistributed, monetised, and repurposed at scale (Chao et al., 2024; Dieter et al., 2019; Lai and Flensberg, 2021; Pybus and Coté, 2024). It is within this layered environment that everyday practices are both authenticated and transformed, laying the groundwork for broader cultural and economic shifts.

Platforms and Generative AI's Evolving Uses: Apps, Agents, and Enterprise

Underpinning this process of appification is a 'platformisation of AI' (Van der Vlist et al., 2025b), where AI functions as both a tool and a foundational platform. AI is increasingly structured around 'foundation models', with prompting emerging as the primary technique for directing these models (Burkhardt and Rieder, 2024: 2). This, amongst others, has led to new types of AI applications tailored to enterprise and industry-specific practices (Van der Vlist et al., 2024a: 10–11), as well as the creation of 'agentic' AI apps presented in the form of 'personae' (Van der Vlist et al., 2025a)—envisioned by some as a replacement for websites and apps as the primary interface between consumers and company services. These specific platform and app developments should be viewed within the broader trajectory of AI systems, evolving from research and development to practical, real-world commercial products and services across various industry sectors—what we term the 'industrialisation of AI' (Van der Vlist et al., 2024a).

Major app stores, market observers, and analysts report a proliferation of AI-powered apps across mobile app stores and web and desktop platforms (e.g., Apple, 2024; Moore and Zhao, 2025; Weatherbed, 2024). For instance, Apple highlighted this trend in its 2023 App Store Awards, noting that 'Generative AI captured our collective imagination this year', and naming it the 'Trend of the Year' (Apple, 2024). In 2024, AI apps saw over $1 billion in consumer spending—a 200% increase year-over-year (Perez, 2024a). The release of developer tools, such as OpenAI's ChatGPT API and the Responses API, has further accelerated the creation of AI 'agents' that can perform actions on users' behalf, such as conducting web searches, scanning company files, and navigating websites (Edwards, 2025; Zeff, 2025b).

Furthermore, amid growing competition, major cloud computing providers, such as Google Cloud, Microsoft Azure, and Amazon Web Services (AWS), continue to introduce new AI tools, products, and solutions. For instance, Google Cloud's AI Agent Space, an AI agent ecosystem programme, is designed to help businesses discover, deploy, and co-create AI agents on their platforms (Ichhpurani, 2024). These tools primarily target the enterprise (and business-to-business) market rather than end-consumers, competing with major industry players such as Microsoft (agents in Microsoft 365) (Ray, 2024), SAP (Joule AI Agents), and Salesforce (Agentforce, 'The Digital Labour Platform').

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Clearly, the AI app economy is booming, with companies continually launching new types of AI tools, some of which are becoming 'daily staples' (Moore and Zhao, 2025). According to a recent Andreessen Horowitz market report from January 2025, based on market research data from Sensor Tower, the top categories among AI consumer apps by revenue include 'Photo/Video Editors', 'Beauty Editors', 'ChatGPT Copycats', and 'General Assistants', followed by more specific categories like 'Language Learning', 'Companion Apps', 'Plant Identifiers', 'Nutrition Apps', 'Translators', 'Music', 'Dictation', 'Math', 'Read Aloud Apps', and 'Writing Assistants'. The sheer variety and number of AI apps being created right now across these 'spheres'—from consumer-facing web, desktop, and mobile AI apps to AI apps distributed via cloud AI platforms and model marketplaces—could lead to 'chaos' in the app stores, with some suggesting that 'we may need an AI just to solve the AI app management problem' (Acharya and Moore, 2025). Indeed, by lowering deployment barriers for people around the globe, these diverse platforms and marketplaces for the distribution, monetisation, and discovery of AI apps—whether marketed as applications, 'agents', 'solutions', custom models, 'GPTs', or other forms—'present one of the trickiest platform governance challenges seen to date' (Gorwa and Veale, 2024: 341). According to Gorwa and Veale, one reason is that AI technologies can manifest as either content or open-ended tools.

Using a methodology involving online forums Reddit and Quora, Zao-Sanders (2025) finds that the top AI use cases have shifted from *technically*-oriented to more *emotionally*-driven between 2024 and 2025. According to their findings, the share of use case themes related to 'Content Creation and Editing' decreased from 23% in 2024 (1st rank) to 18% in 2025 (2nd) and 'Technical Assistance and Troubleshooting' from 21% (2nd) to 15% (4th), while 'Personal and Professional Support' increased from 17% (3rd) to 31% (1st).

These top three categories were followed by 'Learning and Education' (16%), 'Creativity and Recreation' (11%), and 'Research, Analysis, and Decision-Making' (9%). Within these broader themes, 'therapy and companionship' emerged as the leading use case, encompassing structured psychological support and companionship based on ongoing social and emotional interaction, often with a romantic dimension (Zao-Sanders, 2025). Other prominent activities included 'organising my life', 'enhanced learning', 'healthier living', and 'creating a travel itinerary'. This shift toward emotive and companionate uses illustrates how AI appification increasingly extends into intimate, affective, and everyday domains of life, shifting the line between natural and artificial connections in social interactions (Savic, 2024).

Furthermore, AI apps are known to be 'opinionated', showcasing differences in terms of capabilities, personalities, and responses, reflecting the underlying design choices, training data, and the specific goals set by developers. This is 'not a bug, it's a feature', as the saying

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goes—applicable not only to AI companionship apps, such as Replika, but to other application contexts as well. These differences can result in varying user experiences, as each AI app may approach tasks in unique ways, offering diverse solutions, communication styles, or even ethical considerations. However, such variability also underscores the challenge of establishing universal standards and governance for AI apps. Furthermore, the mobile apps of leading AI chatbots—Gemini, Claude, Copilot, Deepseek, ChatGPT, Perplexity, and Grok—all collect data through smartphones. Gemini currently leads the way, collecting 22 different data points across 10 categories from its users. This includes contact information, location, user content, history, identifiers, diagnostics, usage data, purchases, and other data (Lu, 2025).

Finally, users are exploring and discovering new applications of generative AI not only in consumer contexts but also across enterprise settings. Fernandez (2025), using an online search-based approach and public data about 530 case studies, finds that generative AI is being adopted across various departments—including customer support, marketing, IT, operations, and R&D—with 'customer issue resolution' (part of customer service) emerging as the most prominent use case. Over half of the identified implementations occurred in the tech sector, predominantly in North America. This growing enterprise adoption underscores the breadth of AI appification, illustrating how generative AI is not only shaping everyday consumer practices but also becoming embedded in core business operations, further reinforcing its infrastructural and cross-sectoral integration (Van der Vlist et al., 2024a).

There's an AI For That: Exploring Three Spheres of AI Appification

Based on our previous empirical research and conceptualisation, we propose that the appification of AI can be understood as an unfolding process encompassing at least three dimensions (1) the development of *AI-powered applications*, where AI capabilities are integrated directly into the app's functionality; (2) the *everyday applications of AI technology*, focusing on how AI becomes embedded in and transforms routine practices; and (3) the *infrastructural integration of AI technology*, in which AI is woven into existing app architectures, reconfiguring underlying digital infrastructures (Van der Vlist et al., 2025a: 21–24). This framework underscores the multi-sided and multi-layered nature of AI appification, where apps function as immediate interfaces for interacting with AI (front-end appification, targeting distinct user groups) while also serving as conduits for its deeper infrastructural embedding (back-end appification). The design choices made by developers and the adoption practices within industries shape—and are shaped by—how users engage with AI. This interplay

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provides insight into the broader cultural, economic, and political dimensions of AI's evolving role in our digital environments.

Existing app studies provide various foundational empirical strategies and resources for examining the cultures and economies of apps, including sourcing relevant apps, demarcating collections, identifying themes, digital traces of AI infrastructures, models, and services embedded within applications. A notable methodological approach is the 'entry point' approach, which allows researchers to analyse AI appification through app stores, app descriptions, interfaces, archives and repositories, software packages, network connectivity, backend dependencies, and more (Dieter et al., 2019; Helmond and Van der Vlist, 2019). Query design strategies facilitate the collection of AI apps, while screening techniques reveal hidden software integrations (Gerlitz et al., 2019a; Gerlitz et al., 2019b; Weltevrede and Jansen, 2019). By studying AI apps and mapping the ecosystems they belong to, we illustrate how various actors drive the expansion of AI across industries, shaping its cultural and economic impact, while also providing a foundation for further critical analyses focused on political economy and power.

This framework is explored through an overarching ecosystem approach (Van der Vlist et al.), which recognises that different types of apps, app developers, businesses, partners, and other actors all play distinct roles in driving the expansion of AI technologies—rather than focusing solely on end-consumers (or their interface affordances, action possibilities, content, engagement, etc.) in isolation. These integrations, spanning diverse domains, actively shape the cultural and economic dimensions of AI's role in everyday life and across various industries. By mapping the current state of AI appification and studying developments across these distinct spheres, this research underscores the complex and evolving integration of AI into daily practices and its transformative impact across multiple sectors, as well as its ongoing 'industrialisation' (Van der Vlist et al., 2024a).

In all, this report explores how AI apps integrate into everyday activities and workflows, and conversely, how these apps aim to reshape daily tasks, roles, and practices. In doing so, it contributes both empirically and conceptually to our understanding of AI as 'mundane software', while bridging ongoing discussions in the often disjoint subfields of app studies, platform studies, and critical AI studies. Specifically, the report further investigates AI's ongoing appification across three primary sites for the distribution, monetisation, and discovery of AI applications (whether they are called 'apps', 'agents', 'custom models', 'solutions', or other):

1. *AI apps in mobile app stores:* There is a growing presence of consumer AI apps in popular mobile app stores (i.e., iOS apps on Apple's App Store, Android apps on Google

Play). Our previous findings show that AI in these stores focuses on content production, creative expression, language assistance, and companionship, with AI increasingly facilitating interactive and generative actions (Van der Vlist et al., 2025a: 21–24).

2. *AI apps and 'agents' in model marketplaces:* Custom models and 'agents' within emerging model marketplaces, such as user-created 'Custom GPTs' on OpenAI's GPT Store—described as 'custom versions of ChatGPT that combine instructions, extra knowledge, and any combination of skills' (OpenAI, 2023). AI in the GPT Store offers persona-based models for assistance, companionship, and content creation.
3. *AI apps and 'solutions' in cloud marketplaces:* Enterprise-focused AI apps and solutions offered through leading cloud computing and AI platform marketplaces (i.e., Microsoft Azure Marketplace, Google Cloud Marketplace, Amazon's AWS Marketplace). AI in these cloud marketplaces primarily targets enterprise settings, integrating AI into existing business processes across industries.

By mapping the current state of AI appification and studying developments across these diverse spheres, this research highlights the evolving integration of AI into daily practices and its societal impact across industry sectors and spheres of life. Furthermore, this provides important insights aiding ongoing efforts to tackle the challenges of governing digital societies (Van Dijck et al., 2025).

Practical Context and Setting: 'Appification', 'Data-Sprinting', and the App Studies Initiative

As apps increasingly embed themselves into the fabric of everyday life across the globe, it's imperative to grasp and tackle the unique challenges they present. Achieving this demands methodical and empirical exploration, involving a multitude of perspectives and diverse contributions. Recognising this need, the App Studies Initiative (ASI) urges its members, students, and researchers within the broader fields of app and platform studies to expand their horizons beyond conventional disciplinary boundaries and research methodologies. Instead, we advocate for the formation of collaborative teams dedicated to methodological and empirical exploration.

Since around 2015, ASI researchers have fostered collaborations with numerous colleagues and students across universities in the Netherlands, the United Kingdom, Germany, and beyond. This collaboration has been facilitated through various on-site workshops and 'data sprints', which are a collaborative, interdisciplinary format commonly used in 'digital methods' research (e.g., Berry et al., 2015) and 'digital controversy mapping' (Munk et al., 2019). This includes numerous sprint projects that we organised within the annual Digital Methods Summer and Winter Schools at the University of Amsterdam, Department of Media Studies.

The Master's elective course, 'Appification: The Cultures and Economies of Apps', examines probing questions surrounding the culture and economies of apps and app stores. How do apps mediate and shape cultural practices? How are social norms and values embedded into apps? And, how do app stores reflect our cultural and social landscape? In parallel, the course critically investigates the political economy of apps and app stores. How do app stores organise and govern app ecosystems? Who are the key stakeholders in the commodification of app-based data? What kinds of data markets and infrastructures have emerged around apps?

In a relatively short 6-week period, students were introduced to the methodological and theoretical foundations of 'multi-situated app studies' (Dieter et al., 2019), equipping them with approaches, concepts, methods, and tools that leverage the different 'entry points' and empirical research materials available for critical app studies research to tackle these types of questions. Throughout the course weeks, they were introduced to relevant tools for collecting, analysing, and visualising app and app store data, providing them with the skills needed to navigate this complex landscape effectively. At the end of this period, they participated in a one-week data sprint, organised within the Department of Media Studies on March 24–28, 2025. The insights gained during this week form the basis of the contributions collected in this report, rooted in the research conducted during this intensive collaborative endeavour.

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Figure 1.1. Spring Data Sprint and Festive Poster Presentations, 'Appification: The Cultures and Economies of Apps', held at the Humanities Labs, Amsterdam Institute for Humanities Research (AIHR), University of Amsterdam, Netherlands, from March 24–28, 2025. Photos by the authors.

In addition, the Master's Embedded Research Project (ERP), titled 'The Appification of AI: Exploring Emerging AI App Ecosystems and Infrastructures', ran in parallel with the course. Designed and led by us, this ERP project builds directly on an ongoing App Studies Initiative (ASI) research collaboration with Anne Helmond (e.g., Van der Vlist et al., 2025a). As part of the Master's in Cultural Data & AI (MA Media Studies), students had the opportunity to apply for this embedded research project as an elective. This year, five students from a cohort of approximately 135 were selected. From February to May 2025, these students worked with the App Studies Initiative as embedded student research assistants, contributing to this research while auditing the 'Appification' course for conceptual and methodological training purposes. Simultaneously, they developed and wrote their Master's theses under our supervision. Some of the results of this embedded research project are included in this report.

Figure 1.2. 'The Appification of AI: Exploring Emerging AI App Ecosystems and Infrastructures' Embedded Research Project (ERP) lab meeting at the Humanities Labs, and Festive Poster Presentations, held at LAB42, Science Park, University of Amsterdam, Netherlands, on May 9, 2025. Photos by the authors.

Despite their diverse methodologies and perspectives, the contributors—our students—share a common interest in apps and are committed to addressing issues and concerns related to the ongoing process of appification, which unfolds in various ways across the globe. Moreover, engaging in app studies research transcends mere critical conceptual exploration; it necessitates collaboration and a sincere interest in and engagement with the distinct materialities, infrastructures, and relationalities of apps and platforms (Gerlitz et al., 2019; Van der Vlist, 2022). This is crucial for critically assessing the material politics and political economy of apps and platforms, including beyond the mobile ecosystem. Our objects of study, along with their 'native' techniques and materials, are in a constant state of flux, impacting and at times significantly limiting our research opportunities without announcement. Staying closely attuned to and critically monitoring these changes is imperative for effective critical enquiry in this dynamic and complex field.

Overview of the Chapters

This report comprises five original research contributions, each exploring appification in the age of AI. The chapters are organised from broader, general themes to more specific, focused studies. This structure allows readers to first grasp overarching trends and cultural dynamics before diving into particular app categories. These contributions are part of a larger collection of research reports originating from the Spring Data Sprint, not all of which are included in this publication.

In Chapter 2, **Selin Dingeç**, **James Doherty**, **Tobias Martins Adami**, **Ava Weinstein-Wright**, and **Xiao Yang** present the results of the Embedded Research Project 'The Appification of AI: Exploring Emerging AI App Ecosystems and Infrastructures', conducted with us as embedded student assistants at the App Studies Initiative from February to May 2025. This extended chapter provides a systematic, multi-layered investigation into how AI is being deployed and distributed across three key domains: *mobile app stores*, *cloud infrastructure marketplaces*, and emerging *model marketplaces* such as the new GPT Store. Using a mixed-methods approach adapted to the distinct affordances and constraints of each platform, the authors map and critically analyse how visibility, access, and categorisation are shaped within these ecosystems. Building on existing ASI research, their findings underscore structural asymmetries and infrastructural dependencies that shape the appification of AI, highlighting, for example, how cloud platforms reward longevity and integration, how mobile stores curate dominant use cases, and how model marketplaces systematically privilege in-house offerings over third-party alternatives. Together, the chapter lays critical groundwork for understanding how emerging AI app ecosystems—spanning both *consumer* and *enterprise* domains—are governed, who benefits from their design, and how platform dynamics shape the public experience of AI across everyday life and industry or organisational contexts.

The remaining chapters present outcomes from the themed collaborative research sprint in March 2025. Each chapter explores a distinct sector or sphere of life where AI is currently emerging or slowly gaining a foothold—from intimate companionship and religious practice to education and travel planning.

In Chapter 3, 'Worshipping (Through) AI: How AI Is Appifying Religious Practices', **Zuzana Ľudviková**, **Anna Papastylou**, **Hugo van Steenis**, **Vilma Strandvik**, **Finnegan Vitello**, and **Krisztina Vizoli** analyse over 300 religious apps across three major platforms—Apple App Store, Google Play, and OpenAI GPT Store—to examine how AI is integrated into spiritual practices. Their study identifies new forms of AI-mediated religious engagement (e.g, algorithmic guidance, AI personas, and chatbot prayer assistants), highlighting a shift towards personalised, individualised spirituality. The chapter also draws attention to how app store rhetorics frame AI as a legitimate spiritual actor while embedding monetisation and platform logic into religious experiences.

In Chapter 4, 'AI and the Appification of Education', **Caner Sucuoğlu**, Damla Arslantaş, Anil Atay, Yiran Hu, Başak Raşa, and Jin Zou investigate how AI is embedded in educational apps and how this integration is shaping pedagogical models, learner engagement, and platform

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priorities. Combining digital methods with app store analysis and AI-based categorisation, the authors show how personalisation and adaptive learning dominate the landscape, while other educational sectors remain underserved. Their findings also raise concerns around ethical data use and pedagogical transparency, offering a critical perspective on how AI is reshaping the logics and economics of educational technology.

In Chapter 5, 'From Travel Agent to App: AI and Appification in the Travel Sector', **Hanqiong Ding**, **Tianzhirou Guo**, **Anna Hohwü-Christensen**, **Xuanyue Hu**, **Zhiying Li**, and **Larissa van Wijlick** explore how AI-driven travel apps are transforming the way people plan and experience travel. Drawing on walkthrough analysis and store-based research, they show how generative AI tools facilitate itinerary creation and personalisation, while marketing narratives frame AI as a trustworthy 'companion' or 'expert'. They unpack the commercial logics behind these apps, such as subscriptions, gamification, and recommendation systems, and examine how user agency is constrained by algorithmic design and platform monetisation strategies.

Taken together, these contributions trace the rapid integration of AI into everyday life, documenting the diversity and cultural specificities of emerging AI app cultures and economies across both established and emerging app marketplaces. They provide case studies and empirical evidence of how apps are influenced by and adapt to current AI technology developments. This collection of studies highlights the process through which AI technologies are embedded into daily life and practices via apps and app ecosystems—that is, the *appification of AI*—and lays the groundwork for future studies and critiques of the cultures and economies of AI apps.

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Embedded Research Project

2 Embedded Research Project Report

The Appification of AI

Exploring Emerging AI App Ecosystems and Infrastructures

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Abstract

This Embedded Research Project report explores the appification of artificial intelligence (AI) across cloud marketplaces (Amazon AWS, Microsoft Azure, Google Cloud), mobile app stores (Apple App Store, Google Play Store), and emerging model stores (OpenAI GPT Store). As AI transitions from being a backend technology to a user-facing experience, it is increasingly being deployed through developer tools, apps, and platforms across layers of the digital ecosystem. This report outlines our critical analysis of how the dominant platforms in their space govern discoverability, distribution, and framing of AI technologies. The findings aim to illuminate the opacity behind AI deployments and are therefore especially important to anyone who is engaged or interested in today's AI-driven platform economy.

The aim of the project is to map emerging AI app ecosystems and analyse the infrastructures that enable and constrain the deployment of AI technologies. To reach this analysis, our key questions include: *How is the 'appification' of AI manifesting across the mobile, AI, and cloud infrastructure platform ecosystems? What types of AI apps and app*

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ecosystems are emerging, and how do their Infrastructural relationships influence the domains they engage with?

To answer these questions, we used a combined approach of multiple digital and app studies methods. Since each layer and platform had different affordances, we had to employ different approaches to gather comparable datasets. Cloud and mobile marketplaces were examined through query-based scraping, while the GPT Store was analysed using a combination of automated search queries, archival snapshots, and manual data collection. Each method was adapted to the specific constraints of the platform to ensure consistent and comparable datasets.

Keywords: appification · app studies · artificial intelligence (AI) · app ecosystems · app stores · cloud marketplaces · model marketplaces · AI app cultures · infrastructure

Referenced Actors: Amazon · App Store · Apple · Apps4Rent · AWS Marketplace · Canva · ChatGPT · DALL·E · Gemini · Google · Google Cloud · Google Cloud Marketplace · Google Play · GPT Store · Hugging Face · Jetware · Microsoft · Microsoft Azure · Microsoft Azure Marketplace · Mistral AI · Mphasis · Mphasis · NVIDIA · OpenAI · POE · Puzzle Today · Scholar GPT · Sider.ai · WriteForMe · Чат Chat

Key Points and Findings

- The AI app ecosystem is characterised by significant dynamics of dominance and dependence, where a few major tech companies exert control over infrastructure, distribution, and visibility, leading to reliance and potential vulnerabilities for smaller developers and users.
- Visibility of AI applications is structurally conditioned by the platforms hosting them.
- Infrastructural dependency often leads to platform lock-in for developers and users.
- Categorisation within app stores and marketplaces tends to reinforce specific, often narrow, imaginaries of AI, such as productivity or education tools.
- There are asymmetric platform dynamics, with factors like longevity and platform integration driving visibility in cloud marketplaces, while mobile app stores curate visibility and reinforce functional norms, and OpenAI's new GPT Store favours its own GPTs

Introduction

At the surface level, we fail to recognise the interconnected ecosystem of a tree and its roots, we just perceive the tree. Similarly, when we think of AI (Artificial Intelligence), we tend to think just of its ready-to-use services, unaware of the embedded nature of its ecosystems held within society. Within this Embedded Research Project (ERP) report, we reveal one such ecosystem and its infrastructure, the emerging AI app ecosystem, which has derived from the coined 'appification of AI'. The appification of AI refers to the integration of AI within diverse applications, industry sectors, and spheres of life, leading to the emergence of AI apps which 'embed themselves into the fabric of everyday life across the globe' (Van der Vlist & Weltevrede, 2024: 11). To analyse this phenomenon, the aim we set out for this paper was to systematically map out and investigate the emerging AI apps and app/service-ecosystems. These ecosystems are characterised by constellations of actors, featuring dynamic dependencies and interconnections among them (Van der Vlist, 2022). They involve AI applications (ChatGPT, etc.), digital platforms (Apple App Store, Google Store, etc.), organisations (NVIDIA, etc.), data intermediaries, and infrastructure providers (AWS, Google Cloud, etc).

Guiding our research, we engaged with the following research questions provided by the ERP project's host: *How is the 'appification' of AI manifesting across the mobile, AI, and cloud infrastructure platform ecosystems? What types of AI apps and app ecosystems are emerging? How do these emerging AI apps and app ecosystem Infrastructural relationships influence the domains they engage with?*

Through the employment of digital and app studies research methodologies, this report investigates the appification of AI and the broader ecosystem that has emerged due to AI's integration within various digital spaces. The increasing prevalence of AI across industries has led to its transformation from standalone services and models into accessible applications and platforms, fundamentally reshaping how businesses and individuals interact with technology. The report maps out and analyses the evolving ecosystem of appification across the following three major domains ('spheres'): Cloud marketplaces (Amazon AWS, Microsoft Azure, Google Cloud), app stores (Apple App Store, Google Play Store), and emerging model stores (OpenAI GPT Store). Each of these spheres represents a distinct amalgamation of interconnected layers between providers, platforms, and actors, hence their identification as key areas of relevance.

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Conceptual Analytical Framework: Dominance & Dependence

Figure 2.1 illustrates our conceptual analytical framework, with arrows between the nodes indicating the relationships between these domains regarding *dominance* and *dependence*. The arrows between the nodes show how the distinct layers assert dominance over, while also being infrastructurally dependent on, one another, and how this triadic relationship structures the appification of AI. Building on this framework, the report turns to the major industry players that underpin these dynamics. By focusing on key industry players such as Amazon, Google, Microsoft, Apple, OpenAI, and NVIDIA, this study aims to uncover the dependencies that shape this ecosystem and its spheres, highlighting the dominant actors and services that influence AI's distribution and accessibility. Thus, enabling a deeper understanding of how AI-powered applications are commercialised, controlled, and integrated into digital infrastructures, shedding light on the power dynamics (dominance and dependence) at play within the ecosystem (Van der Vlist et al., 2024).

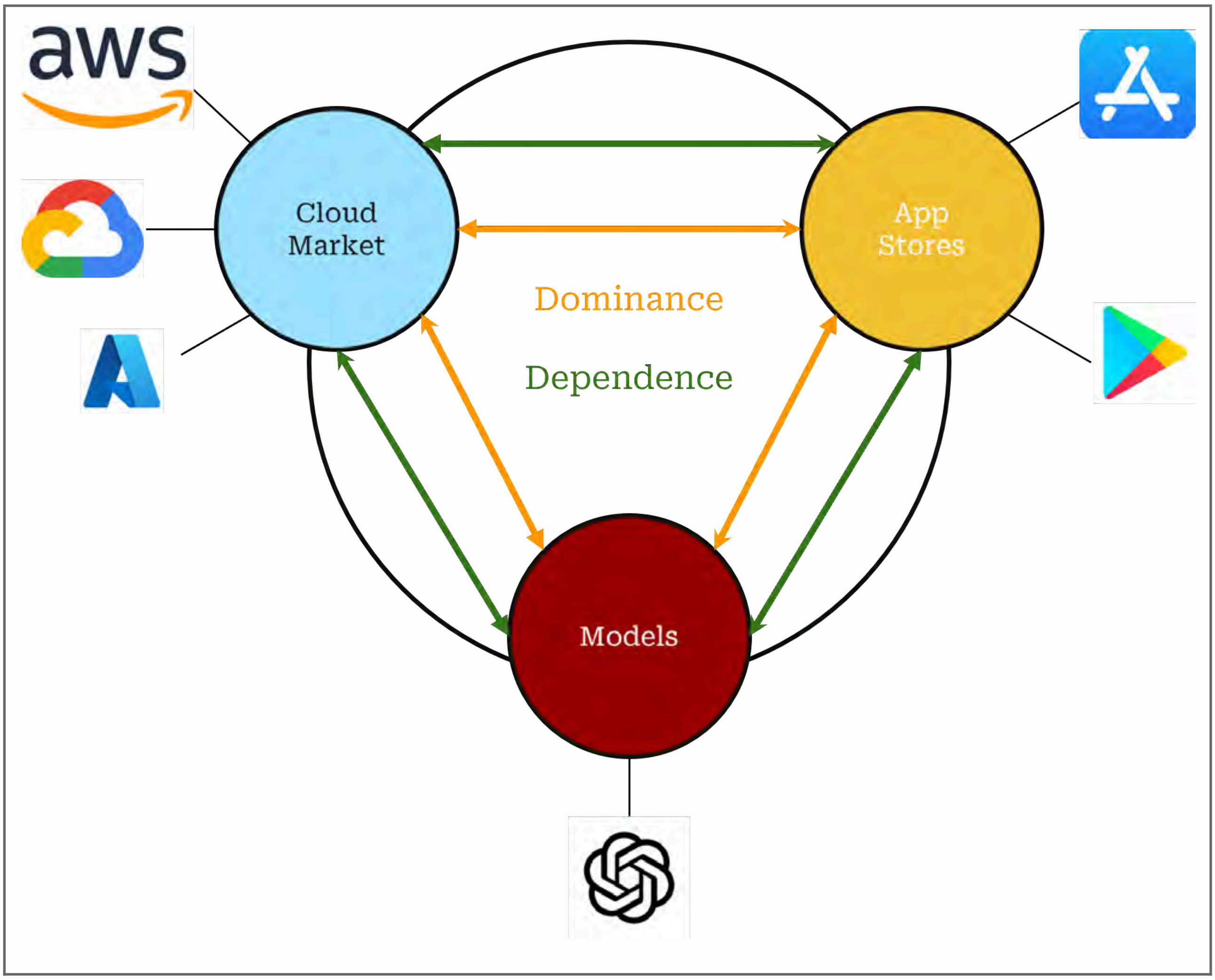

Figure 2.1. Conceptual Analytical Framework: Dominance & Dependence. This figure is illustrative of our investigation into dominance and dependence across the different layers of the AI ecosystem.

This report is of vital importance as it aids our understanding of the emerging AI ecosystem and each of its spheres, allowing for the anticipation and correction of future developments and regulatory approaches. Through mapping out and visualising the ecosystem, the report focuses on the few major tech companies (Amazon, Google, Microsoft, Apple, OpenAI) who control the key spheres (App Stores, Cloud Marketplaces, GPT Store), thus illuminating key actors or interdependencies found within each space. In addition to these, the research also emphasises NVIDIA's crucial position as a key material infrastructure actor, providing the computational hardware (particularly GPUs) that enables AI development and implementation across all domains. The dominance of these few major tech companies comes as a derivative of emerging actors and their increasing reliance on AI platforms and their services, which, in turn, creates possible vulnerabilities for said actors if access, pricing, or policies were to change over time dramatically (Van der Vlist et al., 2024).

The dynamics of dominance and dependence evident within the ecosystem underscore the necessity of a deeper investigative approach to its mapping out and visualisation, highlighting the monopolistic practices at play (Van der Vlist et al., 2024). Therefore, displaying potential risks associated with any over-dependence on these major tech giants and their digital infrastructures within and across the layers of the appification of AI. Understanding the present power dynamics at play will be crucial in navigating the future landscape of AI development and distribution. This report provides a timely and essential inspection of the dominant and dependent actors currently shaping this AI ecosystem, offering insights into how these dynamics may unfold.

Ultimately, this report will serve as a foundational framework for deeper exploration and scrutiny within the mentioned AI ecosystem, offering a starting point for further research into the complex relationships of dominance and dependence that define the current landscape. By mapping out and visualising these preliminary findings within each sphere, we provide a comprehensive view of how power dynamics are distributed across major players and their influence on the broader market. The insights presented here lay the groundwork for future investigations into the evolving structures of this ecosystem, inviting ongoing critique and analysis. Thus, as the appification of AI continues to evolve, this report will act as a critical reference point for understanding the underlying forces at play within its ecosystem.

Overview of the Sections

The report is structured as follows. The following section, 'Definitions, Layers, and Major Players', first defines key concepts—appification, platformisation, infrastructures, dominance, and dependence—and introduces the layered framework used to conceptualise the AI ecosystem. It also concludes with a mapping of major relevant actors, including Apple, Google, Microsoft, and OpenAI, with a more in-depth focus on NVIDIA due to its prominent role across cloud marketplaces. All of these actors are active within the ecosystem under study.

Next, the methodology section introduces our data collection process and the design of our queries across three environments: cloud marketplaces, mobile app stores, and the GPT Store. Next, the Investigation & Findings section presents our findings within these three spheres. Each subsection draws on visual analysis and targeted case studies to highlight the dynamics of dominance and dependence specific to each environment.

The Discussion synthesises these findings, offering a critical reflection on the infrastructural and platform dynamics underpinning the appification of AI. This reflection is structured around three analytical pillars: Visibility (platform-driven dominance), Infrastructure (dependency and entanglement), and Categorisation (the framing of AI's purpose).

Finally, the concluding section proposes several pathways for further research. These are aimed at broadening the scope, inclusivity, and critical depth of future investigations into the AI app ecosystem. Suggestions include: looking beyond Western platforms, expanding query design for greater coverage, conducting longitudinal studies of dominance and dependency, and examining the ethical legitimacy of emerging power structures. The report concludes with a synthesis that outlines the relevance of these suggestions.

Setting the Stage: Definitions, Layers, and Major Players

Definitions

The outlined key concepts (AI, appification, platformisation, infrastructures, dominance, and dependency) represent the components of a cohesive theoretical framework essential for understanding the emergence of the AI ecosystem. AI represents the technological core through which appification of AI expands its accessibility, impacting everyday users and businesses. Platformisation extends this accessibility, enabling the comprehensive integration of digital environments. Underpinning these developments are robust digital infrastructures, crucial for operational scale and market reach. However, the concentration of infrastructural control lies in a few dominant actors (such as Microsoft, Amazon, Google, NVIDIA, and OpenAI). Thus, creating substantial market dominance through the influence of innovation and the limitation of competition. As a result of this, the surrounding actors within the ecosystem experience significant dependency on such infrastructures, subsequently highlighting vulnerabilities and risks associated with such dependencies. Collectively, these concepts allow for a deeper exploration of the structural, economic, and socio-technical dynamics shaping AI and its emerging ecosystems.

Artificial Intelligence

'Artificial intelligence' (AI) is an umbrella term that refers to a set of technologies that enable machines to perform tasks that would typically require human intelligence, such as learning, problem-solving, and language comprehension. Through advancements in machine learning (ML), natural language processing (NLP), and computer vision, AI has been integrated into a variety of digital products and services, making it a core component of modern technological ecosystems. In the context of appification, AI should be perceived as an operational 'technology stack encompassing infrastructure, models, applications, and an ecosystem of applications and companies relying on this stack' (Van der Vlist et al., 2024: 1).

Appification & AI

The concept of 'appification' refers to the conversion of traditional programs, websites, and services into small, self-contained apps (often designed for mobile use) that increasingly shape and commercialise everyday activities (Van der Vlist et al, 2024).

Building on this general concept, the 'appification of AI' refers to the process of transforming AI capabilities into user-friendly applications and services that seamlessly integrate into existing digital infrastructures, influential due to the cultural, societal, and economic significance of applications as a form of software (Gerlitz et al., 2019: 2). The process of appification involves packaging complex AI functionalities such as ML models, speech recognition, and automated decision-making, into intuitive applications or services designed to assist businesses and individuals by enhancing efficiency and automation in relevant contexts. By embedding AI within widely used platforms (mobile apps, cloud-based services, and chatbot interfaces), appification lowers the technical barriers for the adoption of AI and makes advanced computational capabilities more accessible to non-experts.

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A key aspect of appification is the ability to provide AI-driven insights and automation through interfaces such as APIs,[2] cloud-based services, and embedded digital assistants, as exemplified by Xu (2019). Consumer-facing tools like Snapchat's AI chatbot and focused cloud solutions such as AI-powered analytics services exemplify how AI is becoming an integral part of everyday interactions across multiple digital levels. This shift allows businesses and platforms to integrate AI functionalities without requiring extensive in-house expertise, thereby accelerating AI and its adoption across various industries (Gan, 2023).

Platformisation & AI

Closely linked to appification is the concept of 'platformisation', which refers to the 'penetration of the infrastructures, economic processes, and governmental frameworks of platforms in different economic sectors and spheres of life' (Poell, 2019: 5). In the context of appification and AI, platformisation refers to the shift from isolated AI models and standalone applications to integrated, scalable AI-powered platforms. This process enables AI functionalities embedded within larger digital ecosystems, making them more adaptable, customisable, and widely available through applications, services, and APIs.

Platformisation involves creating ecosystems where AI can be leveraged as a service by multiple stakeholders. For example, a platform such as OpenAI provides an API that offers businesses and developers access to AI tools (ChatGPT) that can be integrated into various workflows and products without the need to build AI models from scratch. This approach fosters interoperability, scalability, and widespread adoption by enabling AI functionalities to operate as an adaptable layer within existing and emerging digital environments (Luitse, 2024; Van der Vlist et al., 2024).

The interplay between appification and platformisation is shaping the evolution of AI, transforming it from a specialised technology into an everyday utility. While appification democratises AI by embedding it into user-friendly applications, platformisation ensures that AI capabilities are scalable and accessible across multiple industries. Together, these processes drive the widespread adoption of AI, shaping an evolving ecosystem that requires systematic mapping to understand its structure, stakeholders, and impact.

[2] Application Programming Interfaces (APIs) are sets of protocols and tools that allow different software applications to communicate with each other. Acting as intermediaries that takes requests from a user, sends them to a server, and then returns the server's response back to the user.

Infrastructure & AI

Within the context of appification and its related AI ecosystems, the concept of 'infrastructure' refers to the foundational components, such as data centres, servers, and cloud computing facilities, which are utilised to develop, host, and deliver AI technologies (Van der Vlist et al., 2024). For relevant actors (tech startups, established companies, etc.), these infrastructures enable access to and the deployment of relevant AI models and services. Major providers of said infrastructures include AWS, Microsoft Azure, and Google Cloud, otherwise referred to as the 'Great Houses of AI' (Crawford, 2021: 20, cited in Van der Vlist et al., 2024: 2). Each of which exemplify the underlying role of infrastructures within the appification and platformisation processes, thus acting as essential gateways for the digital economy.

Focusing on infrastructure is crucial for understanding and mapping the highlighted ecosystem (AI). The availability, structure, and capabilities of said infrastructures profoundly influence market dynamics, adoption rates, and innovation possibilities for smaller actors/startups, making them essential for analysing AI's integration within the ecosystem (Van der Vlist et al., 2024).

Dominance & Dependence

Intrinsically linked to infrastructure in this context, *dominance* describes the disproportionate market power or influence exerted by the small number of companies that control key infrastructural and platform layers, as mentioned (Amazon AWS, Microsoft Azure, Google Cloud) (Van der Vlist et al., 2024). Such dominance derives from the monopolistic control each company maintains over critical resources such as advanced AI models, computational hardware, and distribution channels. Each 'house of AI' exemplifies said dominance through its capacity to dictate innovation, pricing, and market standards for smaller actors within the ecosystem. Hence, it is a central component for the analysis of how power and control manifest within the AI ecosystem, affecting competition, innovation, and access to AI resources, simultaneously influencing the overall shape and future development of AI and its uses.

Dependency within this context refers to the condition wherein the smaller actors such as developers, businesses, or even entire industry/governmental sectors, who rely significantly on the 'great houses of AI' (NVIDIA (GPUs), AWS, Azure (cloud hosting), and OpenAI (AI models) for essential AI-related services and resources (Van der Vlist et al., 2024). Thus, leading to vulnerabilities related to pricing and access conditions within the ecosystem. Through the

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illumination of such dependence within the ecosystem, we attempt to illustrate the systemic implications of the monopolistic division of power between AI ecosystem players.

What Is a GPT?

A GPT (Generative pre-trained transformer) is a deep learning model pre-trained on vast text data and can be fine-tuned for tasks like language generation, sentiment analysis, translation, and text classification (Yenduri et al., 2024). In short, it is an AI model that allows for the generation of human-like text. The emergence of the AI model ecosystem has become relevant due to the rapid advancement and integration of LLM chatbots in everyday life (Zhao et al., 2024). Namely, through OpenAI's ChatGPT platform, which created a bridge between advanced AI systems and everyday users.

OpenAI's GPT models are important as they are the foundation of the platform for the chatbot, but also for the development of the user-generated GPT apps. The success of the model has led to the dominance of OpenAI's model in the AI ecosystem, in turn, creating the foundation for further development. OpenAI released GPT-1 in 2018, GPT-2 in 2019, GPT-3 in 2020, and GPT-4 in 2023. A wide range of large language models (LLMs) exists today, including Google's BERT, PaLM, and Gemini; Meta's LLaMA; and Anthropic's Claude. Instead of offering a selection of different models, the GPT Store exclusively builds on OpenAI's model, allowing creators to customise its behaviour through the steps summarised in Table 2.1.

Steps	What You Do
(1) Access the GPT Editor	Go to chat.openai.com/gpts/editor or click your name > 'My GPTs'.
(2) Initiate Creation	Click 'Create a GPT' to begin building a new custom GPT.
(3) Define GPT	In the Create tab, describe what you want your GPT to do.
(4) Configure Basic Settings	In the Configure tab, you can: • Name your GPT • Write a short description • Upload a profile image • Enable features like web browsing or image generation
(5) Add Instructions and Features	Also in the Configure tab, you can: • Upload up to 20 reference files • Provide detailed instructions for behaviour • Set prompt starters • Add knowledge or define custom actions using APIs
(6) Test the GPT	Use the test panel on the right to chat with your GPT and make sure it functions as expected.
(7) Publish the GPT	When ready, click 'Publish'. Choose whether to keep it Private, Link-only,

	or make it Public.
(8) Manage and Monitor GPTs	Go to 'Manage Workspace' > 'GPTs' to view and edit your GPTs, manage access, and monitor usage (number of chats).

Table 2.1. How to Make a GPT.

Note: This table uses information from the OpenAI site 'Advice and answers from the OpenAI Team' (OpenAI, n.d.). It explains the simple steps of making a GPT for users with a premium account.

Layers and Major Players

To understand the dynamics of dominance and dependence within the appification of AI, it is necessary to trace how AI systems move from development and training to deployment and distribution. This progression unfolds across three interconnected layers: the Foundational Layer (AI models), the Infrastructural Layer (cloud platforms and access), and the Deployment Layer (distribution environments). This layered framework builds on platform and infrastructure studies (Gerlitz & Helmond, 2013; Gerlitz et al., 2019; Plantin et al., 2016; Van der Vlist et al., 2024), while drawing directly on Blanke and Pybus' (2020) argument, that technical integration produces 'invisible and sometimes involuntary alliances' that structure digital ecosystems to illuminate the opacity regarding how power is structured and exercised across the AI ecosystem. Building on Helmond et al.'s (2019) articulation of the app/infrastructure stack, we position these layers as mutually reinforcing sites of socio-technical control and economic power (9).

AI, as an umbrella term, cannot be treated as a discrete technology. Thus, this approach seeks to highlight the stacked and interdependent nature of AI integration, from model development and hosting to user interfaces. Although the framework simplifies a complex and entangled ecosystem, it provides a useful lens through which to investigate the infrastructural arrangements through which AI is commercialised and accessed.

Foundational Layer: Models

Operating AI models are located at this layer. This includes large language models (LLMs), image generators, and other general-purpose AI systems. These models are developed by a small group of highly resourced actors, such as OpenAI (*GPT-3*, *GPT-4*), Anthropic (*Claude*), Google (*Gemini*), and Meta (*LLaMA*). These models serve not just as technical infrastructures, but as strategic products and are central to each company's platformisation of AI. While these firms act as developers, their scale and influence distinguish them from smaller app developers, who rely on these models, typically accessed via APIs, to integrate AI in their applications or services. This positions organisations developing these models as foundational, providing them with upstream influence over the entire AI stack.

Infrastructural Layer: Hosting & Access

This layer includes the cloud platforms that host AI models and enable access through APIs, software development kits (SDKs)[3] and other developer tools. Providers like Amazon with their Amazon Web Services (AWS), Microsoft with Azure, and Google Cloud offer the computational infrastructure required to train AI models at scale. These cloud infrastructure providers enable other companies to integrate AI models into apps, websites, or workflows without building their own infrastructure. Because developing and operating large-scale AI models requires significant computational resources, many actors depend on powerful cloud infrastructure to access the necessary hardware. Key components such as GPUs and AI accelerators form the technical backbone of this layer, with companies like NVIDIA supplying much of the high-performance hardware. This hardware is integrated into the infrastructure of cloud platforms such as AWS, Azure, and Google Cloud, which makes these resources accessible to developers and organisations at scale. Therefore, 'cloud platforms control not only computing infrastructure but also the marketplaces for AI models and applications, representing a dual power' (Van der Vlist et al., 2024: 13). Consequently, cloud providers constitute a key infrastructural layer mediating the distribution, scalability, and accessibility of AI capabilities within the broader ecosystem.

Deployment Layer: Distribution

This layer includes the platforms where AI reaches end users. This includes mobile app stores (Apple's App Store, Google Play) and emerging model marketplaces (OpenAI's GPT Store). These platforms serve as interfaces between AI systems and end users by providing curated access to applications built on or integrating foundational models. Although these platforms may not develop models or operate infrastructure, they govern the distribution, visibility and monetisation of AI-powered apps through ranking algorithms, editorial curation, and platform policies. While app stores may not directly depend on the cloud or models, the AI apps they distribute do. As the user-facing layer in the stack, the Deployment Layer mediates how AI

[3] A software development kit (SDK) is a collection of software development tools in one installable package. They facilitate the creation of applications by having a compiler, debugger and sometimes a software framework.

mediates how AI services built on upstream infrastructure and models become accessible and actionable in everyday contexts.

Actor	Layer		
	Model	Infrastructure	Deployment
Microsoft	Exclusive access to OpenAI's GPT-4/4o; integrated into Microsoft services (e.g., Copilot).	Operates Azure, a leading cloud platform for hosting models and applications.	Operates Microsoft Store; focuses on Microsoft 365 ecosystem and enterprise integration.
amazon	Investor in Anthropic (Claude); developing own models (Titan) for enterprise use.	Operates AWS, a dominant infrastructure provider offering AI APIs and services.	No proprietary app store; emphasises B2B tools and Alexa-based distribution.
Alphabet	Develops own LLMs (e.g., Gemini) for various applications.	Offers Google Cloud, a key provider of AI infrastructure and APIs.	Operates Google Play Store; deeply integrated with Android OS for consumer distribution.
Apple	No standalone LLM; integrates AI into Siri and ecosystem; increasing partnerships (e.g., OpenAI).	Limited proprietary infrastructure; uses hybrid strategies (on-device/cloud partnerships).	Owns and curates the App Store, which is central to distributing AI on iOS and VisionOS.
OpenAI	Develops foundational models (GPT-3.5, GPT-4, GPT-4o).	Relies on Microsoft Azure to host models and serve APIs via the OpenAI platform.	Operates the GPT Store, a curated marketplace for ChatGPT plugins and GPT-based tools.
NVIDIA	Provides CUDA (a programming interface that lets developers write AI code optimised for NVIDIA GPUs) framework and pretrained foundation models.	Dominant supplier of GPUs and platform software; powers data centres for major platforms.	No app store or end-user interface; presence mediated through partnerships and hardware infrastructure.

Table 2.2. Cross-Layer Presence of Major AI Ecosystem Actors.

This entangled ecosystem is even more convoluted as certain major players established themselves across multiple layers and the material infrastructure that underpins them. Companies such as Apple, Microsoft, NVIDIA, Alphabet (Google), Amazon, and increasingly OpenAI do not operate exclusively within one layer; rather, they maintain a strategic cross-layer presence. Through that, they are shaping how AI is developed, distributed, and made visible.

As Van der Vlist et al. (2024) notes, 'Amazon, Google, and Microsoft have integrated all three elements of the cloud AI stack—infrastructure, models, and applications—into their extensive cloud offerings' (12) and have become 'the dominant infrastructure platforms' through their 'access to vast amounts of data, substantial computational resources, and a geopolitical edge' (13).

This cross-layer entanglement is not only infrastructural but also economic. As of 2025, Apple, Microsoft, NVIDIA, Alphabet, and Amazon are the five most valuable companies globally by market capitalisation, underscoring how tightly economic power is linked to infrastructural and platform control. These companies function, Petit (2020) argues, as 'oligopolies', meaning that they are simultaneously competing and collaborating across markets while serving as both suppliers and gatekeepers (3). A reason for this may also be that these companies not only provide the infrastructure, but they are also platformising it by building marketplaces around them. Indeed, Zhu et al. (2024) argue that many 'technical platforms now operate in a store-centric way: essential services and functionality are provided by the platform while access to extensions/add-ons is offered only through interaction with the app store' (3). This dynamic of platformised service integration deepens dependency on these actors and further consolidates their infrastructural role, making them central to our analysis of AI app ecosystems.

Other actors such as Meta, IBM, Oracle, AMD or Hugging Face, and Stability AI also play major roles in the AI ecosystem. We choose, however, not to focus on them as their positions are usually more specialised. Meta, a major AI player and social media giant currently facing antitrust proceedings over its consolidation of platforms like Instagram and WhatsApp (Reuters, 2025), exemplifies deployment-layer dominance by integrating Meta AI across said apps and its root platform, Facebook (Meta, 2025). It differentiates itself from Amazon, Microsoft, and Google, as Van der Vlist et al. (2024: 14) note, through its focus on digital marketing, AR/VR, and open-source initiatives like LLaMA (Meta, 2024). IBM, a legacy technology company, delivers AI primarily through enterprise consulting and software (Bajwa, 2025). Oracle, a company known for its cloud and enterprise software, integrates AI into more industry-specific cloud services like retail optimisation tools (Oracle, 2025). AMD contributes at the hardware layer through its partnership with Stability AI, co-developing 'AMD-optimised' generative models like Amuse 3.0 (Wilson, 2025). Hugging Face supports the open-source ecosystem by providing 'a central place or hub for model developers to publish' and fine-tune transformer-based models (Jain, 2022: 52). While the Hugging Face Hub functions in a

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store-like way and could be analysed as part of the broader platform landscape, we chose not to focus on it within this report due to its primarily developer-facing orientation. However, Hugging Face reappears throughout the report as a key cross-platform actor, especially through collaborations with NVIDIA.

AI's Material Dimension

Beyond the software that defines their functionality, each layer of the AI ecosystem possesses a real material dimension. This tangible physical infrastructure supports and powers all other layers (Table 2.3). High-performance computing enables model development (GPT-4o, Gemini), but access is governed through platforms like the GPT Store; cloud services rely on large-scale hardware but are accessed through platforms like AWS or Azure; deployment involves devices like smartphones, yet app stores tightly control distribution. The material infrastructure and the software-platform layer are mutually dependent, with each enabling and shaping the functioning of the other (Blanke & Pybus, 2020). This layered entanglement between infrastructure and platform is a defining feature of the appification of AI. To further illustrate the significance of this material layer, we now turn our attention to a key actor in this space: NVIDIA.

Layer	Hardware (Function)	Infrastructure (Service)	Platform (Interface)
Model	High-performance computation for model training (e.g., GPUs and accelerators | NVIDIA, Google, Intel)	Model development and hosting (e.g., OpenAI GPT-4o, Google Gemini, Anthropic Claude)	Model marketplaces (e.g., GPT Store, Hugging Face Hub)
Cloud	Scalable compute infrastructure and data storage in data centres (e.g., GPU clusters, cloud-optimised CPUs)	Cloud-based hosting services (e.g., AWS, Azure, Google Cloud)	Cloud marketplaces (e.g., AWS, Azure, Google Cloud)
Deployment	Consumer devices for app execution (e.g., smartphones & tablets)	Mobile operating systems (e.g., iOS, Android)	App distribution platforms (e.g., App Store, Google Play, Microsoft Store)

Table 2.3. Ecosystem Layer: From Material Infrastructure to Platform Interfaces Major Players.

Major Player: NVIDIA

NVIDIA's Background

NVIDIA was originally renowned for its high-performance graphics processing units (GPUs), primarily providing powerful hardware support for the gaming, graphic design, and professional visualisation markets (NVIDIA Corporation, 2023). As a traditional hardware manufacturer, NVIDIA has long held a significant position in the high-end graphics card market, thanks to its leading advantages in parallel computing. However, with the rapid development of AI technologies and the widespread adoption of deep learning applications, NVIDIA began to gradually transform from a sole hardware supplier into a comprehensive AI solution provider that integrates hardware, software, and platforms (Cusumano, 2023).

This transformation is evident in both hardware and software. On the hardware side, NVIDIA launched dedicated products like the Tesla GPU series, built specifically for deep learning training and inference (NVIDIA Corporation, 2017). On the software side, it developed tools such as CUDA, cuDNN, and TensorRT, which simplify and accelerate AI development by making GPU performance more accessible to developers. With the widespread adoption of these technologies, NVIDIA has gradually built a vast AI ecosystem covering multiple fields, including data centres, cloud computing, autonomous driving, robotics, and edge computing. Throughout this process, NVIDIA has continuously achieved strategic leaps—from hardware supply to platform ecosystem development—through open platforms, strategic partnerships, and technological innovation, thereby securing a pivotal position in the global AI industry chain.

Tracing Dependency and Dominance in NVIDIA's platformization Trajectory

Against the backdrop of rapid advancements in information technology and AI, platformisation has become a crucial pathway for transformation and upgrading among major tech enterprises. As defined by Helmond (2015) and expanded by Van Dijck et al. (2018), platformisation involves the expansion of platform logics across previously distinct sectors, embedding software-mediated coordination, data extraction, and programmability into broader socio-technical systems. NVIDIA's ecosystem, developed under these circumstances, exemplifies this trend by building a multi-sided platform that enables hardware-software synergy, technological empowerment, and ecosystem-wide collaboration, thereby driving transformation across the entire AI industry.

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Within this emerging platform economy, questions of dependency and dominance are increasingly urgent. Cloud service providers such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud have built AI offerings that rely heavily on NVIDIA's GPU architectures and software frameworks like CUDA, TensorRT, and cuDNN. However, this infrastructural dependence is not fixed or total; rather, it is the outcome of ongoing negotiations. Competing platform actors are actively seeking to reduce reliance on NVIDIA by developing custom AI chips and alternative acceleration frameworks. As Helmond, Nieborg, and Van der Vlist (2019) argue in their analysis of Facebook's infrastructural entrenchment, platform power is not a natural given but the result of incremental integrations, boundary work, and strategic partnerships that embed the platform across domains (124–125, 137–141).

Simultaneously, through ecosystem governance and the evolution of its business model, NVIDIA has not only secured a dominant position in the hardware market but also taken on a leading role across the entire AI industry chain. Also, 'the platform ecosystem is moored in paradoxes: it looks egalitarian yet is hierarchical; it is almost entirely corporate, but it appears to serve public value; it seems neutral and agnostic, but its architecture carries a particular set of ideological values; its effects appear local, while its scope and impact are global; it appears to replace 'top-down' 'big government' with 'bottom-up' 'customer empowerment' (Van Dijck et al., 2018). Exploring its ecosystem governance mechanisms and the evolution of its platform-based business model can reveal how a company builds competitive advantage through platform strategies, achieves value co-creation, and how such a model reshapes industry structure and market competition dynamics.

Methodology

Data and Methodology

Our study investigates the appification of AI across three infrastructural layers, each corresponding to a different type of marketplace. These layers—*model*, *cloud*, and *deployment*—structure how AI systems are developed, hosted, and made accessible to end users. Accordingly, we examine (1) *cloud marketplaces* (Amazon AWS, Microsoft Azure, and Google Cloud) as the infrastructural layer for hosting and scaling AI models; (2) *mobile app stores* (Apple App Store and Google Play Store) as deployment platforms where AI applications are distributed to users; and (3) the *GPT Store* as an emerging space for user-facing AI agents. Each of these spheres affords different forms of access, visibility, and classification, and thus requires distinct methodological approaches. This layered approach is visualised in Figure 2.1, which outlines the relations of dominance and dependence structuring AI's infrastructural ecosystem. While the cloud and app store layers both rely on a query-based data collection approach, the specific logic and query design are outlined in a dedicated section below ('Query Design'). In the following subsections, we will outline our processes of data collection, cleaning, and the other analytical methods for each layer. In some instances, it was possible to apply uniform processes across several layers; nevertheless, the technical and infrastructure limitations of each marketplace influenced the overall approach in each case.

Cloud Marketplaces

The data used for the cloud marketplaces study originates from three major cloud marketplace platforms: AWS, Microsoft Azure, and Google Cloud. Data was collected using the ASI/DMI 4CAT App Studies Capture & Analysis Toolkit to gain a comprehensive understanding of the cloud market's ecosystem deployment and technological applications in the cloud computing market. During the data collection process, we focused on the following key actors: 'model_name', category, 'creator', 'app_id', 'description', and 'pricing'. However, due to the lack of a unified data structure across platforms, we first carried out a standardisation of the title field. AWS, Azure, and Google each use different naming conventions; through manual review, comparison, and script-based transformation, we harmonised the titles of these actors across platforms to facilitate subsequent analysis.

We encountered specific challenges regarding pricing information. While AWS provides comprehensive pricing data, Google Cloud did not include pricing in the data captured by the tool, and Azure also presented inconsistencies and gaps in pricing data. After careful consideration, we ultimately decided to exclude detailed pricing analysis and instead focus on other variables more directly aligned with our research objectives.

The category data allowed us to systematically examine the primary fields or industries served by technologies across the three cloud marketplaces, such as AI, machine learning, data analytics, or computer vision. Meanwhile, creator data provided the foundation for deeper exploration into the developer ecosystem. We paid particular attention to recurring creators appearing across multiple platforms, such as Hugging Face, Mistral AI, Jetware, etc. By conducting web-based research into these creators' backgrounds and technical expertise, we sought to uncover the interconnections within the developer ecosystems of different platforms, such as NVIDIA's pivotal role in ecosystem governance and business model evolution.

After completing data collection, we conducted detailed cleaning and preprocessing of the raw data using the Pandas Library in Python to ensure the effectiveness and accuracy of subsequent analysis.

To begin with, we standardised field names across the different platforms to establish a unified variable structure, including 'model_name', 'category', 'creator', 'app_id', and 'description'. Then, we deduplicated the 'app_id' and 'model_name' fields to prevent duplicate records of the same application or service from affecting the analysis results.

Given the inconsistent formatting of the creator field across platforms (variations in capitalisation, spacing, etc.), we applied a format normalisation process—removing leading and trailing spaces and converting all entries to lowercase—to ensure consistency in cross-platform comparisons.

For the category data, we conducted frequency statistics and analysis to reveal the distribution and variation of cloud marketplace services across different application domains. Meanwhile, the processing of creator data focused on identifying creators that appeared on multiple platforms, exploring inter-platform connections, and understanding developers' technological focus and strategic preferences.

Mobile App Stores

To analyse the appification of AI in user-facing environments, we collected the data from the two major mobile marketplaces, the Apple App Store and the Google Play Store. Same as in the cloud marketplaces, we used a query-based approach to retrieve app listings, which we discuss more in depth below under query design. The retrieved data structures of the two mobile platforms presented unique challenges that required special handling procedures.

Due to platform limitations, our queries could retrieve only a maximum of 50 results each. While this isn't exhaustive of all apps listed under these queries, it mirrors the visibility limits of users searching for these apps. Therefore, the subsets of available apps we retrieved reflect the entries the platforms prioritise for the chosen terms. Additionally, due to divergent naming conventions, field availability, and data completeness, significant preprocessing was required. We manually standardised field names across all platforms to ensure that app information was consistent and comparable across stores. A significant issue came up when matching developer names. While some developers used the same nomenclature on both platforms, others used slightly different variations ('Ltd' vs. 'Limited'), necessitating normalisation approaches similar to those used in the cloud marketplace study.

Another problem we encountered was that several developers with multiple apps appeared to be unrelated to artificial intelligence. These entries were retrieved due to keyword matches, particularly in the query [Natural Language Processing]. Companies such as Springer Nature Limited, Harmony Hypnosis Ltd, and Yateland Learning Games for Kids Limited generated false positives because their apps were not AI-related in function or content, but did contain language-related descriptors in their app descriptions or developer names, which were caught by our query. According to Rogers (2013: 7), critical query design entails more than just retrieving data; it also includes evaluating and refining what is significant in the dataset. Therefore, to preserve the meaningfulness of the visualisation, we excluded these entries from the final developer count.

OpenAI GPT Store

In addition to datasets collected from major cloud marketplace platforms and mobile app stores, our study used three complementary approaches to examine the GPT Store, which lacks direct API access and therefore could not be analysed using tools like the App Studies Capture & Analysis Toolkit. As a result, our analysis is based on three separate datasets. The first includes 84,913 GPTs scraped via the store's search bar, aimed at surfacing GPTs that are not visible on the curated homepage. The second dataset was compiled from homepage snapshots gathered through the Internet Archive. To address the archive's gaps, we also used a dataset collected previously by Esther Weltevrede et al. as part of their initial study of the 'appification of AI' (Van der Vlist et al., 2025). The third dataset consists of manually recorded data from the GPT Store homepage over the period from January to July 2024. By having these three datasets, we can examine the GPT Store from different angles over time, forming a more thorough analysis. However, collecting these datasets also reflects the limitations of accessing and scraping data from the GPT Store. It signifies our attempt to work around these barriers and investigate how the platform functions. Below, we outline the specific steps taken to collect each dataset.

To enable the scraping of GPTs, we collaborated with researcher Ivan Kisjes. We queried the GPT Store's search bar using sequential two-letter combinations from the Latin alphabet (e.g., 'aa', 'ab', ... 'zz'). We implemented an automated auto-scroll function to capture the search results, which typically ran up to 19 times per query, as scrolling beyond that point triggered interface errors. Within each scroll, the code clicked on every GPT that appeared in the results and scraped metadata from each icon, displaying its details, what we refer to as a GPT's 'card'. Because the store uses a dynamic loading structure, GPT information only becomes visible once a card is clicked, requiring the scraper to interact with each one individually. This scraping process was completed in March 2025 and took several weeks due to the scale of the dataset and the limitations of the interface.

It is important to emphasise that our dataset includes only GPTs retrieved using search terms ranging from ‘aa’ to ‘zz’. We chose to use only the Latin alphabet for time and logistical reasons, but acknowledge that this decision limits the scope of our findings. As a result, the dataset mainly captures GPTs with names beginning in Latin characters, excluding those written in non-Latin scripts. That said, some GPTs in non-Latin languages still appeared in the dataset, likely due to the GPT Store’s undisclosed search ranking algorithm. For example, querying ‘ji’ surfaced a GPT created by ‘By Jeong Young Jin’, which included Korean characters, demonstrating that some GPTs using non-Latin characters were included in the results, even though they were not the target of our queries. Ultimately, the GPT Store’s search engine remains opaque, as OpenAI has not disclosed the underlying mechanisms, thus impacting our data collection process.

For the second dataset, we used the Internet Archive (archive.org) to access historical snapshots of the GPT Store homepage, focusing on the period between May 4, 2024, and September 3, 2024. The Internet Archive is a tool designed to help researchers view past versions of websites, making it possible to track changes in structure, content, and availability over time. It allows for automated crawling, snapshot creation, and user-contributed archives (Internet Archive, n.d.). Using this data, we observed how the GPT Store’s interface changed, identified which GPTs were featured, tracked shifts in categorisation, and observed the introduction of new GPTs.

Finally, our study used the manually collected dataset created in 2024 (Van der Vlist et al., 2025). This dataset includes data points from the GPT Store homepage, covering the period between January and July 2024. It includes GPT names, descriptions, creators, and their placement within homepage lists. Using this dataset, we focused on two important points. First, we examined the ‘Roles’ that GPTs often embody, a researcher-assigned dimension inferred from each GPT’s intended function or specialisation, such as ‘Wizard’ or ‘Scholar’. This allowed us to explore the tasks these models are created for, comment on the common identities assigned to AI agents, and compare them to a larger dataset to see how they have changed over time. Second, we analysed the ‘Categories’ under which GPTs appeared, such as ‘Featured’ or ‘Writing’, which offer insight into how OpenAI curates and structures visibility within the store. Approaching the analysis from these two areas helped us trace how GPT roles have evolved and what AI agent roles are emphasised in the platform’s presentation.

Query Design

Integrating AI into diverse digital applications represents a significant shift from stand-alone services to accessible applications, transforming how humans engage with the technology. Digital marketplaces serve as curated entry points for the distribution and discovery of AI-powered software (Van der Vlist et al., 2024). To navigate the complex ecosystems of digital marketplaces and further investigate said appification, we relied on query design as a methodological approach in the cloud marketplaces (AWS, Microsoft Azure, and Google Cloud) and mobile app stores (Apple App Store and Google Play Store).

When we look for something online, like searching for apps in an app store, we use specific words or phrases that we type into a search bar. These search terms are referred to as queries. However, these search terms are not neutral retrieval tools (Rogers, 2017), as they function to find apps based on the specific words that developers use and what the platform's algorithms deem relevant to you. This is what Richard Rogers (2017) highlights in the context of digital methods. He argues that the way queries are formulated is not merely procedural, but also as an analytical act. Shaping the findings in what is surfaced and, crucially, what remains hidden. Developers strategically adopt certain terms to signal technical value, user appeal, or marketplace relevance, which in turn shapes how their apps are findable. As such, query design enables us to trace how AI emerges and is framed across platforms.

Finding AI apps among the overwhelming number of applications requires a strategic approach. Using a carefully curated set of search queries that account for different phrasing is essential for accurately identifying them. The terms we choose relate to AI in a technical sense and exhibit a range of specificity and connotation, moving from general concepts to more granular technical descriptors. Table 2.4 below summarises the terms used, their common variations, and their retrieval intent.

Query Term	Query Term Variations	Definition	Search Goal
[Artificial Intelligence]	[AI|Ai]	Broad label for systems mimicking human intelligence.	Identify generally framed AI apps through the umbrella term.
[Chatbot]	[Chat Bot]	Applications simulating conversation using AI.	Capture apps framed around dialogue, interactivity, or assistant-like behaviour.

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[Machine Learning]		Algorithms that learn from data to make decisions.	Detect apps presenting learning-based or adaptive functionalities.
[Deep Learning]		Subfield of ML using neural networks for complex tasks.	Retrieve apps signalling technical complexity or depth in modelling.
[Large Language Model]	[LLM]	AI models trained on large text corpora for language tasks.	Locate apps referencing model-based language generation or comprehension.
[Natural Language Processing]	[NLP]	Techniques for understanding and generating human language.	Surface apps emphasising language parsing, analysis, or interaction.

Table 2.4. Query Terms for Identifying AI Apps Across Marketplaces.

Note: These queries act as semantic signals within app store metadata. While rooted in technical concepts, their appearance in app descriptions reflects developer framing strategies and marketplace visibility tactics. Their meaning may shift depending on the context of use and presentation.

Employing variations like [AI|Ai|Artificial Intelligence] or [Chatbot|Chat Bot] was a deliberate strategy to maximise coverage within the marketplaces. To see how consistent our search terms were, we did a Query overlap analysis. This means looking at the overlap of identical entries over the retrieved datasets. This analysis confirmed that while related search terms and their variations retrieved overlapping sets of applications, the overlap is rarely total. If two search terms have a significant overlap, it suggests they are semantically close, meaning they point to similar apps. Therefore, we expected variations like [Artificial Intelligence|AI|Ai] to return similar results. However, overlaps between them happened to be minimal or entirely absent in some cases (Figure 2.2). This lack of overlap suggests that a large number of apps, in his case, within the app store, utilise the broad umbrella term 'AI', leading to significant differentiation in search outcomes even for seemingly identical search queries. Analytically, this constraint is useful since it reveals how developers and platforms discursively present their appified AI services.

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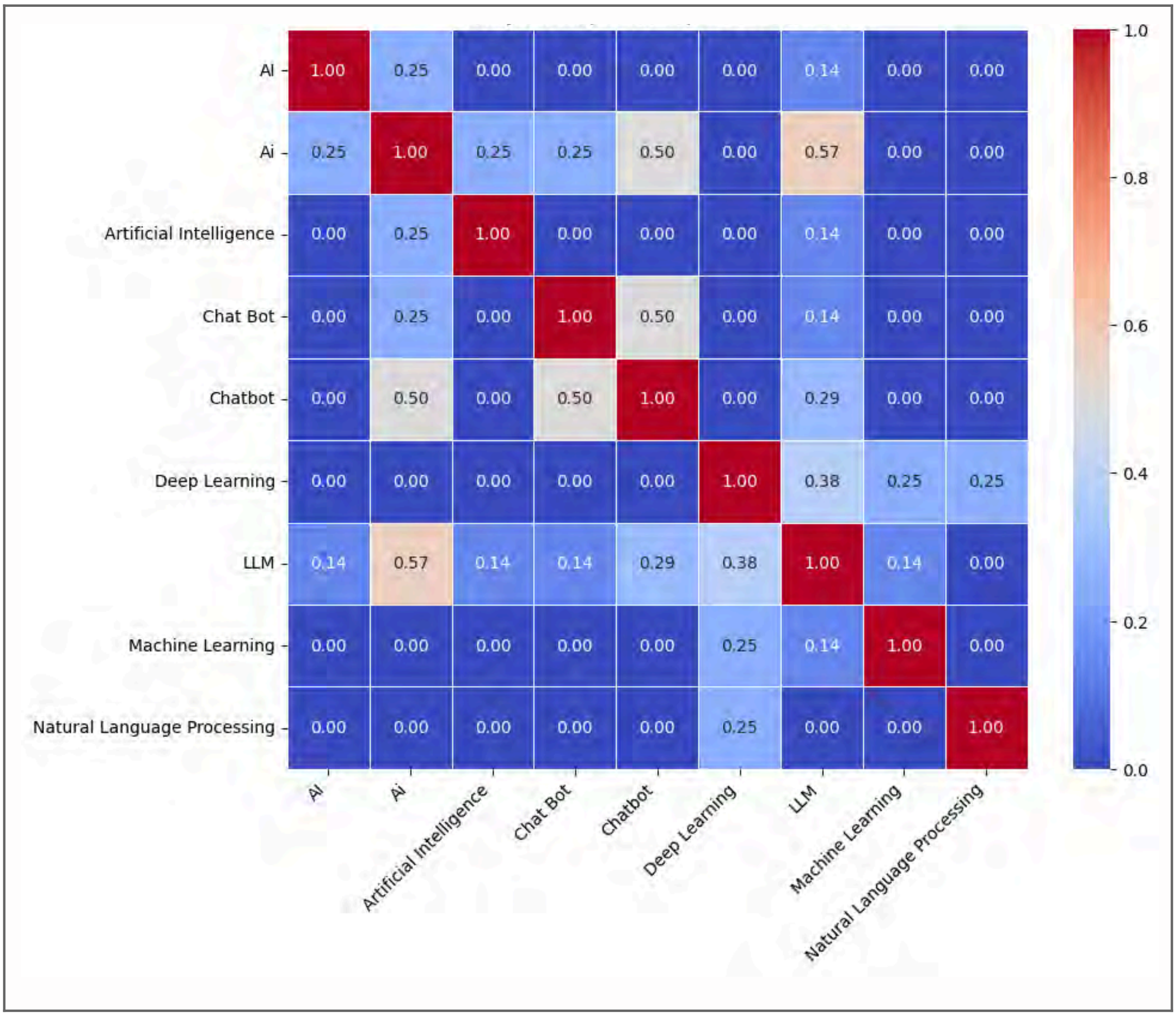

Figure 2.2. Query Overlap Heatmap (Example: Google Play Store).

Note: This heat map shows the degree of overlap between app sets retrieved by different AI-related query terms on the Google Play Store. A value of 1.00 indicates complete overlap; 0.00 means no overlap. The observed overlap of less than 1.00 for variations of query terms indicates that different phrasings retrieve different sets of apps.

The presence of terms like AI, chatbot, or machine learning in app titles or descriptions signals how AI is being branded and made visible within digital marketplaces. These terms make applications more visible to users searching for AI-related technologies, shaping how such apps are discovered and understood. Since each term and its variations were captured through the search functionalities native to each marketplace, the output was inherently limited to a subset of available applications that are visible within the platform. This means the retrieved results reflect not only semantic variation, but also platform-specific constraints such as caps on searchable listings. Thus, while a query-based approach may not identify every technically AI-enabled app, it does capture how AI is strategically framed and marketed.

Having outlined the methods we used, we now turn our attention to the findings of our multi-layered investigation. We will begin with the presentation of our findings within the cloud marketplace.

Investigation & Findings

In the following section, we present our findings on the appification of AI across the three layers: cloud marketplaces, mobile app stores, and the new OpenAI GPT Store (a model marketplace). Through the analysis of each of these layers, we aim to report how AI is made visible, categorised, and conditioned by platform logic through each of their distinct affordances. For each layer, we begin by examining patterns in visibility, actor presence, and app classification, followed by selected case studies that illustrate these dynamics in practice.

Beginning with the cloud marketplace, we show how actors such as *Mphasis*, *Apps4Rent*, and *NVIDIA* have become dominant through infrastructural embedding. Next, we turn to the mobile app stores, where we will map how apps surface across AI-related queries, show the distribution of AI developers across stores, and how AI apps are being classified. We follow this with case studies of the actor *Codeway* and the app *POE* to illustrate market dynamics at the deployment layer. Finally, we explore the GPT Store as a model marketplace, foregrounding how interface design and ranking systems structure the discoverability of AI agents. The GPTs *Чат chat*, *WriteForMe*, *Scholar GPT*, and *Canva* will then be presented to illustrate the dynamics within its emerging platform.

Cloud Marketplaces: Amazon AWS, Microsoft Azure, and Google Cloud

Cloud marketplaces, at their core, are digital infrastructures where various forms of computing services, including storage, networking, AI, and databases, are provisioned on demand. These platforms enable users ranging from individuals to enterprises to build, deploy, and scale applications globally (Miryala, 2023). The origins of cloud computing as a concept trace back to the late 1990s, but it was AWS in 2006 that transformed cloud from a theory into a full-fledged economic platform (Gartner, 2019).

Today, the most prominent cloud platforms are AWS, Microsoft Azure, and Google Cloud Platform. These services promote themselves not only as cost-effective and secure infrastructures but also as innovation facilitators that accelerate digital transformation across industries (Sikha, 2024). However, their deep integration into software development and AI often obscures the cultural and strategic influence they wield.

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By setting the technical foundations for software deployment, these platforms increasingly dictate how software is built, shared, and monetised through their proprietary APIs, machine learning pipelines, and data storage architectures. Their pricing models, availability zones, and even certification systems shape what counts as 'scalable' and 'enterprise-grade' (Luitse, 2024). Much like app stores rank visibility, cloud platforms structure opportunity. As Rodon Modol and Eaton (2021) emphasise, this architectural evolution often takes the shape of a 'core-periphery structure', where entrenched infrastructures progressively reorganise themselves around a dominant core, shaping developmental dependencies and consolidating control.

Moreover, these platforms foster digital lock-in, subtly guiding user behaviour and platform dependency over time. What appears as neutral infrastructure is often a highly curated environment optimised around platform loyalty and service expansion. In this way, cloud services have become 'culturally embedded', shaping both the economics and ideologies of the digital age (Van der Vlist et al., 2024).

Therefore, studying cloud markets is absolutely necessary—not just to understand technological infrastructure but also to appreciate the power dynamics and cultural norms they create. As the invisible backbone of today's software ecosystem, cloud markets significantly impact innovation.

Figure 2.3 shows the top 20 developers based on the number of AI-related services offered across the three major cloud marketplaces: AWS, Azure, and Google Cloud. This comparative perspective not only depicts service volume but also shows strategic distribution patterns. Some developers, such as Mphasis, have a strong alignment with AWS, suggesting significant infrastructure connections and specialised integration. Others, such as Apps4Rent, have a larger platform presence, with considerable listings in both Azure and Google Cloud. While also indicating a more modular approach, and a strategy focused on flexibility and cross-market visibility.

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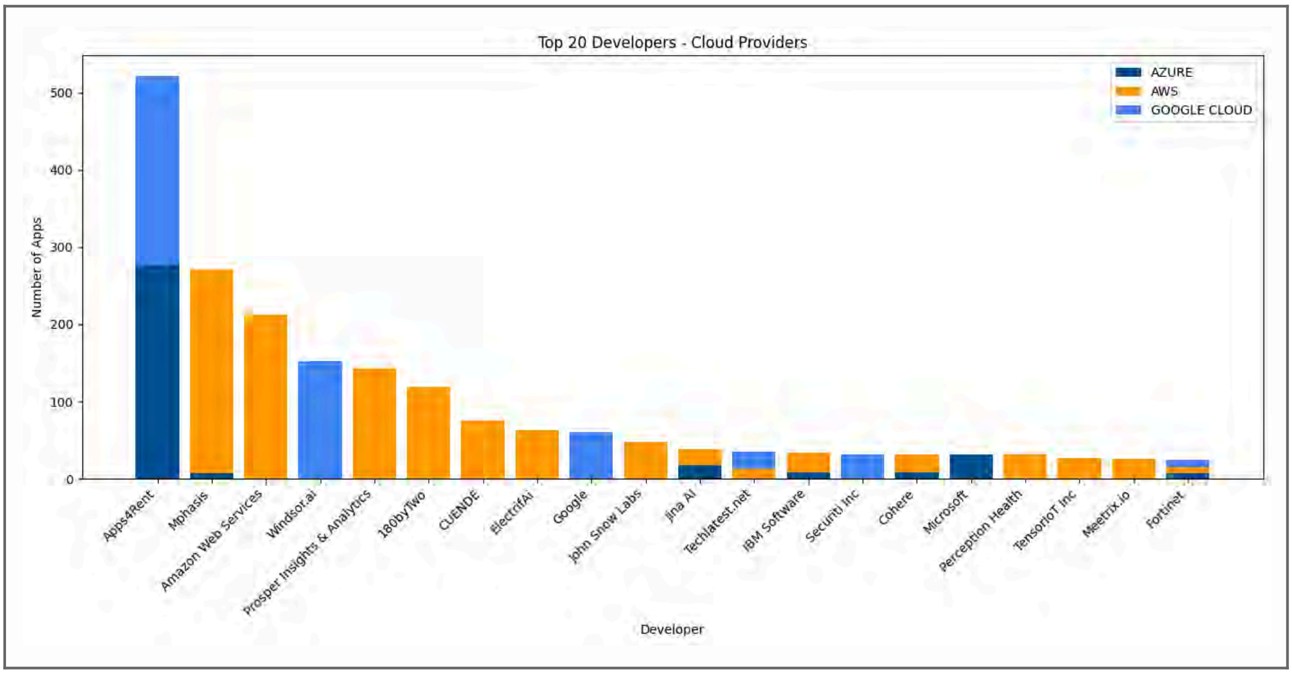

Figure 2.3. Top 20 Developers Across AWS, Azure, and Google Cloud.

What is notable in this figure is that the number of listings alone does not equate to platform dominance in a vacuum, but rather hints at a developer's strategic role within the platform's service ecosystem. For example, high frequency may imply service bundling, onboarding tools, or optimisation utilities, whereas platform-specific clustering frequently indicates infrastructural linkage or early partner rights.

This chart thus prepares the groundwork for a deeper analysis of platform-conditioned[4] influence and dependence cycles. In the following part, we examine Mphasis and Apps4Rent as two case studies that reflect different approaches: one based on vertical integration and performance optimisation within AWS, and the other on multi-platform accessibility and onboarding convenience within Google Cloud and Azure. Each developer's position in the graph is not just a metric of quantity, but a reflection of broader infrastructural dynamics, governance patterns, and platform logics that shape the appification of AI.

Case Studies

Mphasis

After analysing the data collected for the AWS, we discovered *Mphasis*, a dominant actor within the Marketplace. As shown in Figure 2.4 below, Mphasis appears repeatedly as one of

[4] The way in which platform structures, policies, and affordances shape what is possible, visible, or successful within a digital environment.

the most active vendors across key AWS categories. These categories reflect the business-oriented nature of the platform, organising AI-related services by business function or industry use case, including technical domains such as Machine Learning and Data Analytics, as well as sector-specific categories such as Healthcare or Financial Services.

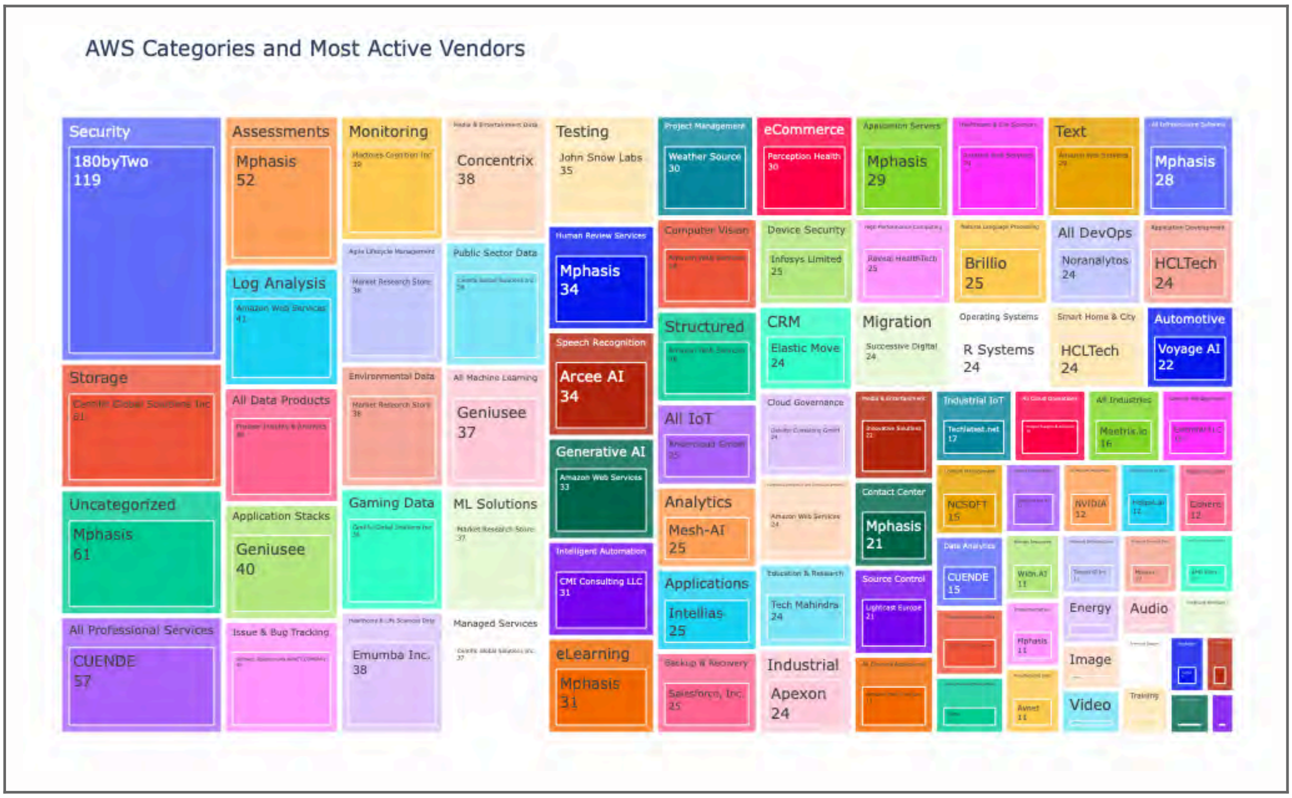

Figure 2.4. AWS Categories and Most Active Vendors. This figure highlights Mphasis's consistent presence across key AWS categories, demonstrating its long-established visibility and influence as a structuring force within the AWS Marketplace. The categories are ranked from most prevalent (top left) to least prevalent (bottom right), with each column being ordered from top to bottom, moving from left to right. Additionally, the top actor within each category is displayed within the category box.

Founded in 1988, Mphasis operates primarily within the sectors of finance, insurance, and healthcare and has since positioned itself as an AWS premier partner[5] (AWS, n.d.) . Due to their respective market dominance, Mphasis plays a key role in the appification of AI for enterprise use, as they are recognised for their strategic collaborations with AWS to accelerate the adoption of cloud-based generative AI solutions (CRN India, 2024). Mphasis has appeared as a structuring force, one whose offerings have come to shape how AI services are packaged, accessed, and distributed within the marketplace. Their array of AI solutions is offered throughout the AWS Marketplace, many of which are featured across analytics and machine

[5] The most experienced partners to the AWS marketplace that are recognised as leaders in their respective geographical, vertical, or horizontal markets.

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learning categories, exemplified via their high recurrence across AWS subcategories displayed in Figure 2.4 (Mphasis, n.d.).

As AWS evolved its marketplace taxonomies, introducing more granular filters, many of the query refinements were seemingly constructed around solution patterns, thus being closely aligned with Mphasis's offerings (Vishweshwara, 2024). This connection then allowed Mphasis to maintain category-level infrastructural visibility, essentially giving them direct market exposure due to correlation. This means that products that fit Mphasis's service design parameters are more likely to appear within these platform sections and results, thus reinforcing their dominance within the marketplace.

Such dominance has since caused a feedback loop of dependency between relevant actors. Small and medium enterprises (SMEs) and startups are developing specific sector ML tools and services tailored to match the approaches pioneered by Mphasis (AIM Research, 2024). Thus, the AWS marketplace infrastructure, in effect, normalises Mphasis's design logic as a default for smaller actors to feed off. In doing so, Mphasis not only benefited from early platform privilege but has subsequently become a referential blueprint for others in the space.

In conclusion, the case of Mphasis exemplifies platform-conditioned dominance, where infrastructural familiarity, early partnership, and integration into the logic of discovery (in the context of AWS Marketplace) give a third-party actor disproportionate sway not only in how services are consumed but also in how they're conceptualised, categorised, and adopted.

Apps4Rent

Similar to *Mphasis*, *Apps4Rent LLC* emerged as a prominent actor within the Google Cloud Marketplace, with its strong presence reflected in Figure 2.5 below, which illustrates the company's high activity and visibility across several leading Google Cloud categories. These categories reflect the enterprise-focused nature of the Google Cloud Marketplace, organising cloud-based and AI-related services by business function, industry use case, and technical specialisation. This includes core domains such as Machine Learning, Data Analytics, and DevOps, as well as specific categories such as SaaS and ApI's, Virtual Machines, and Vertex AI.

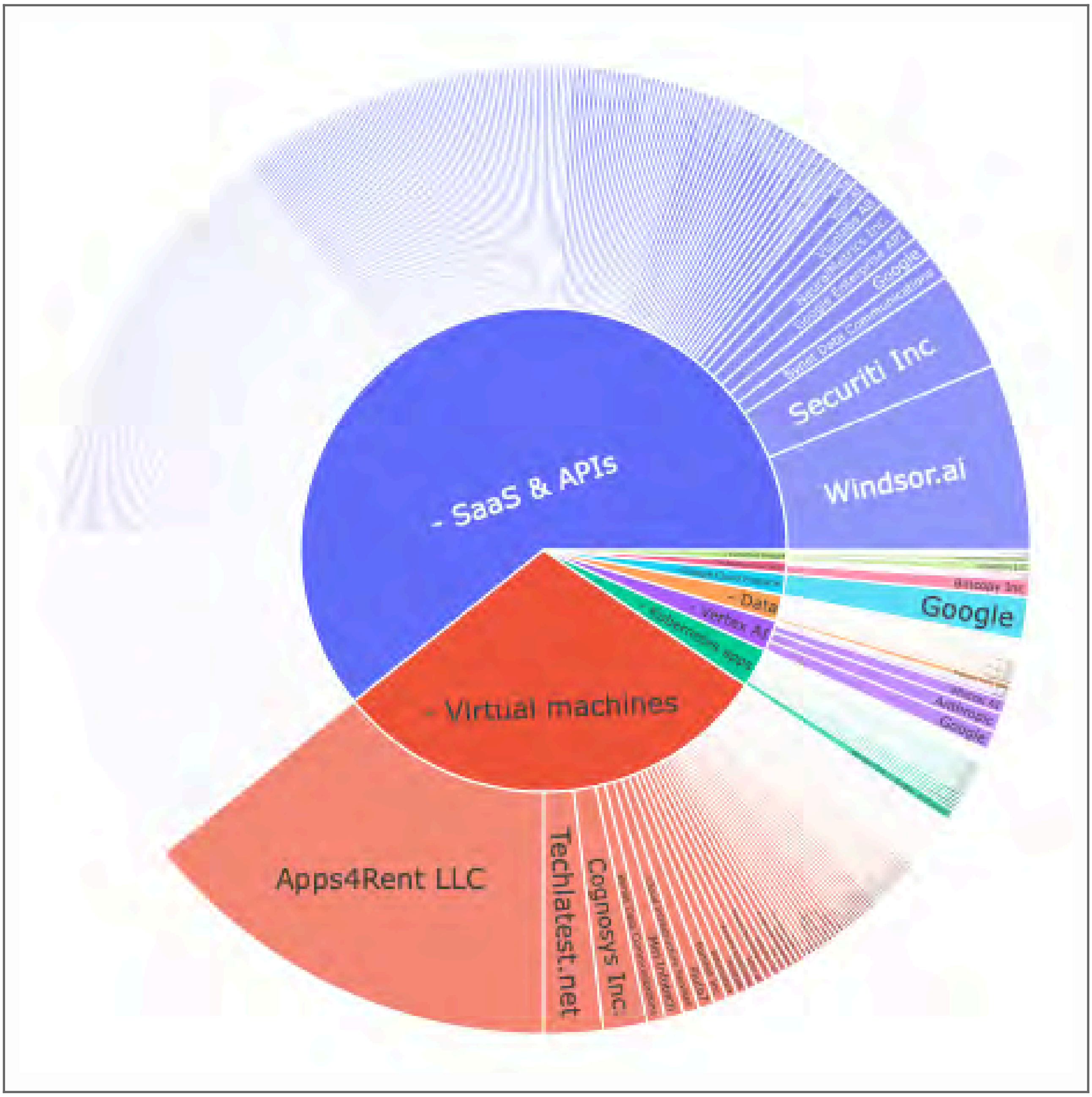

Figure 2.5. Google Cloud Top Categories and Most Active Actors. This figure illustrates Apps4Rent's frequent appearance within curated categories, particularly those related to productivity and enterprise services, reinforcing its role as a soft infrastructural gateway for smaller actors entering the Google Cloud marketplace.

Founded in 2003, Apps4Rent operates as an enabler within the Google Cloud Marketplace and acts as a leading provider of hosted software applications, including app hosting environments and productivity integrations (Apps4Rent, n.d.-a). Their prominence within the Google Cloud Marketplace is reflected not just in the volume of their services but also in the placement of their offerings within curated categories, furthering their exposure and influence within the space.

Apps4Rent's services facilitate the onboarding process for a wide range of smaller actors entering the Google Cloud ecosystem. Through offering comprehensive migration services to Google Workspace, they serve as a soft gateway into the platform, providing access to scalable infrastructures such as BigQuery (data analytics), Vertex AI (machine learning), and TPU-hosted applications (high-performance computing) (Apps4Rent, n.d.-b; Google Cloud, n.d.-a; Google Cloud, n.d.-b; Google Cloud, n.d.-c). As such, many actors maintain technical dependencies on Apps4Rent long after the migration process concludes, specifically within the context of managed services. Their role in providing ongoing support and infrastructure management ensures that actors can effectively utilise Google Cloud's capabilities without the need for expertise.

NVIDIA: From Hardware to Infrastructural Power

NVIDIA is undergoing a profound transformation from a traditional hardware manufacturer to a leading AI platform provider. This transformation is not only driven by core tools such as CUDA, TensorRT, DeepStream, and RAPIDS, which provide robust technical support for GPU-accelerated computing, deep learning training, and inference, while significantly lowering the development barrier, but also by strategic partnerships with major cloud platforms like AWS, Azure, and Google Cloud. As Helmond et al. (2019) argue, platform evolution often depends on the careful formation of such partnerships, which help embed a company's technology across multiple layers of digital infrastructure.

Through these collaborations, NVIDIA has built what is often called a multi-sided ecosystem: a platform environment that brings together hardware producers, software developers, and service providers. In such systems, value is co-produced by different actors who rely on shared tools and standards. One of the key outcomes of this arrangement is a form of platform governance, where NVIDIA sets the technical and operational rules that others must follow, without necessarily owning the entire platform. This governance includes decisions about which tools are compatible, which frameworks are optimised, and how updates roll out across services (Plantin et al., 2016).

To explore how NVIDIA's ecosystem is distributed across different cloud providers, we conducted an inventory of NVIDIA-powered AI services on AWS, Azure, and Google Cloud using the App Study Tool. Figure 2.6 below shows the number of services related to NVIDIA technologies listed in each marketplace. As the figure indicates, AWS has the highest number of NVIDIA-integrated services, followed by Azure. In contrast, Google Cloud offers fewer such

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services, reflecting its strategic focus on developing its own proprietary chip architecture, the TPU (Tensor Processing Unit), instead of relying on NVIDIA's GPU stack (Google Cloud, 2020).

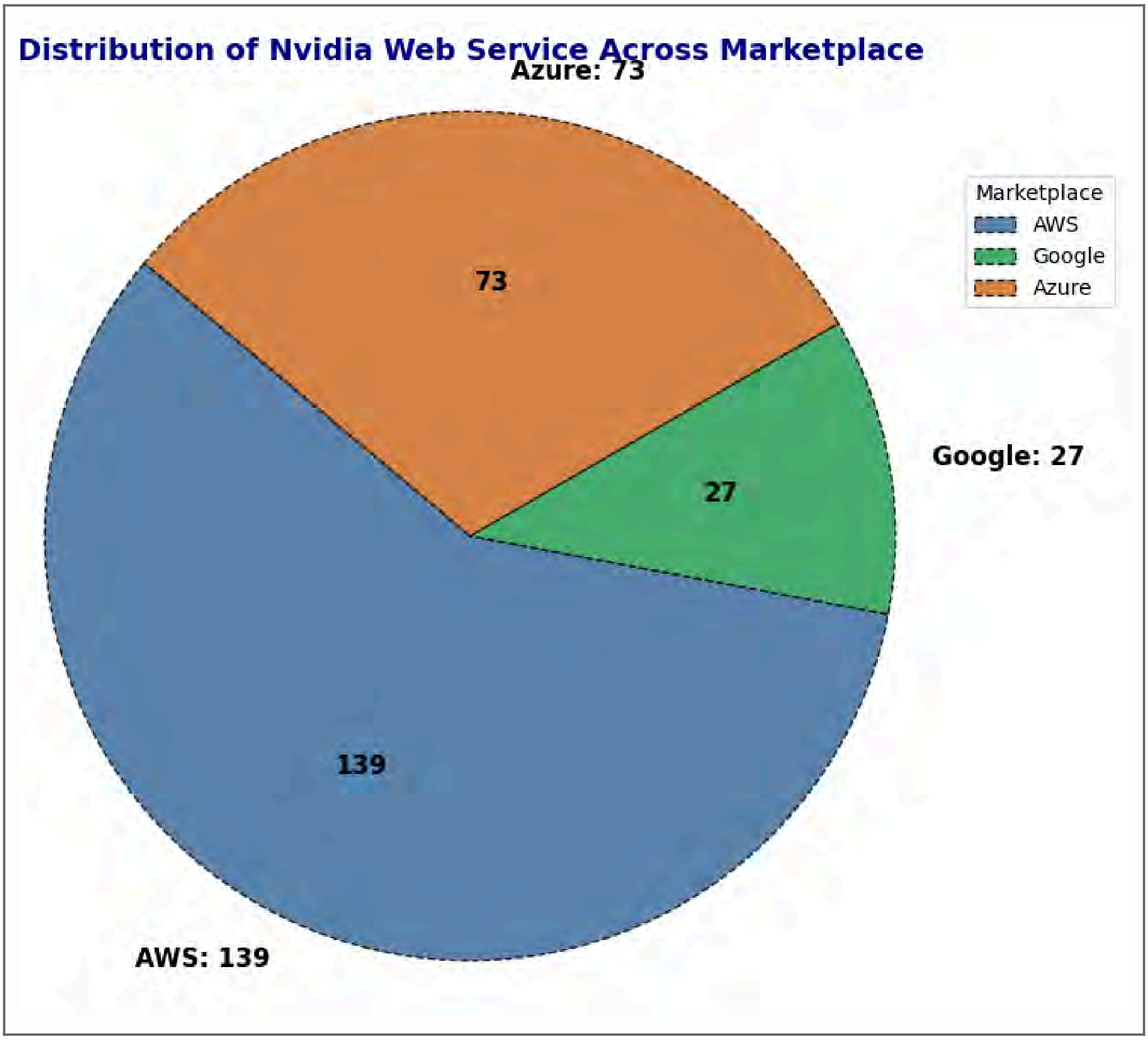

Figure 2.6. Distribution of NVIDIA Web Service Across Cloud Markets.

This divergence illustrates how each platform adopts a different strategy: AWS appears to align more deeply with NVIDIA's ecosystem, while Google seeks greater independence. These differences highlight the dynamic relationship between technical support, market positioning, and ecosystem coordination. It also helps explain the presence of cross-platform creators such as Hugging Face and Mistral AI (Figure 2.7, see purple nodes), developers who build applications that can work across multiple platforms. These actors often serve as interoperable bridges between different infrastructures, and we explore their role more directly in the following section (Figure 2.7).

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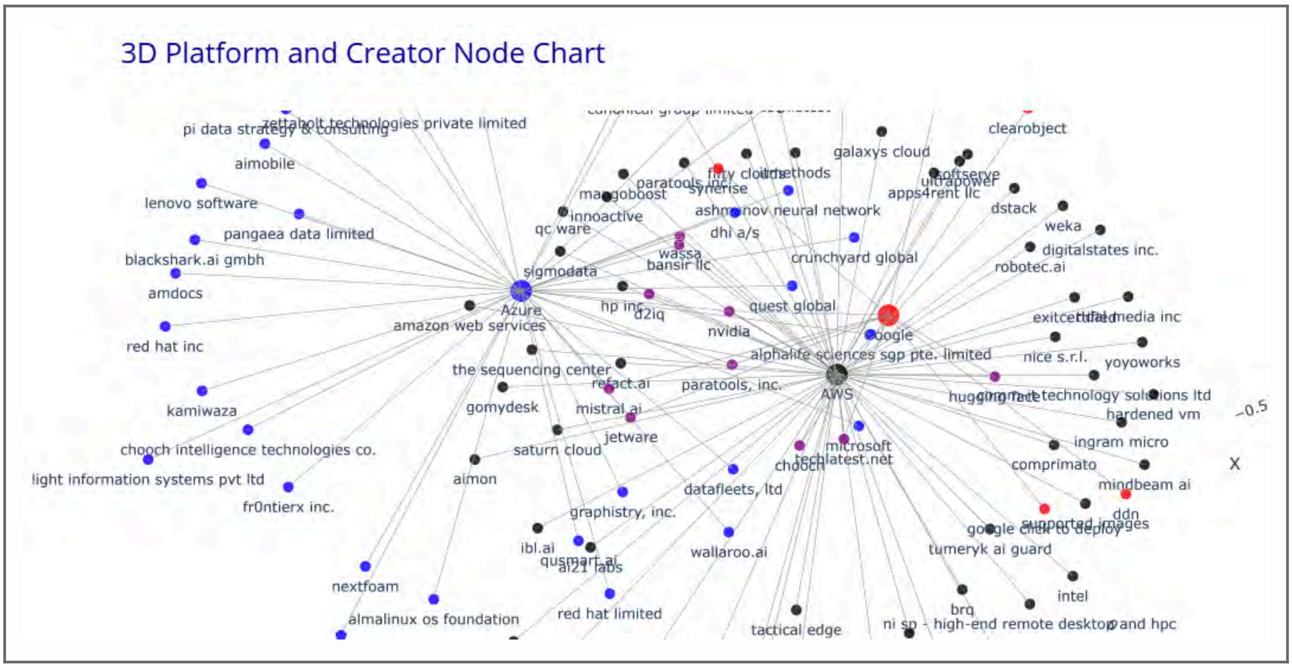

Figure 2.7. 3D Node-Link Visualisation of NVIDIA-Related Services across Platforms and Creators.

Platform Dependency: Developers are Deeply Bound to the NVIDIA Technology Stack

Developers, ranging from startups, software vendors, open-source communities, to enterprise teams, who want to integrate AI into their services, often build them, as previously mentioned, on existing technological infrastructures provided by cloud platforms that, in turn, rely on NVIDIA's stack. To make this layered dependency visible, we visualised the relationships between developers, platforms, and NVIDIA's core infrastructure using data collected from the AWS, Azure, and Google Cloud marketplaces. We used the ASI/DMI 4CAT App Studies Capture & Analysis Toolkit to collect metadata on AI-related services, including information on the name of the model, its category, developer/creator, and hosting platform. After cleaning and standardising the data. For example, to unify naming formats and remove duplicates, we constructed a network graph showing which developers are connected to which cloud platforms and to the NVIDIA ecosystem. Each node represents either a developer or a platform (AWS, Azure, or Google Cloud), and each connecting line indicates a service relationship, such as a developer deploying an NVIDIA-based application on a platform. The closer and more clustered the nodes, the more concentrated the activity around that platform. This network reveals a two-layer dependency: cloud platforms rely on NVIDIA's GPU infrastructure and software toolkits (CUDA and TensorRT), and developers rely on the NVIDIA-enabled environments that these platforms provide. The result is a tightly interlinked ecosystem with NVIDIA at its core.

The size and density of the clusters vary by platform, as shown in Figure 2.7. AWS, positioned near the centre, forms the largest and densest cluster, suggesting that it hosts the most NVIDIA-powered services and attracts a larger number of developers. Azure also shows a strong cluster, though slightly smaller. At the same time, Google Cloud appears more peripheral, reflecting its relatively limited adoption of NVIDIA technologies compared to its use of proprietary TPU infrastructure. Purple nodes represent developers that offer NVIDIA-based services on more than one platform, including notable players like Hugging Face, Jetware, Mistral AI, and D2iQ. These cross-platform creators act as ecosystem bridges, making their tools and services compatible across different cloud infrastructures.

These patterns illustrate how developer behaviour and infrastructure decisions are tightly linked to broader platform strategies. Developers tend to gravitate toward environments that offer standardised and powerful tools, like NVIDIA's CUDA or TensorRT, which explains their concentration around AWS and Azure. At the same time, platforms use these tools to attract more developers, reinforcing a cycle of dependency. This aligns with Plantin et al. (2016), who argue that platform infrastructures gain power by becoming deeply embedded in technical and organisational systems across sectors (3). This infrastructural layering not only shapes technical development but also reinforces NVIDIA's role as a central actor in governing the AI ecosystem.

Platform Dominance: NVIDIA's Central Role in the Ecosystem Structure

Building on the dependency structure discussed in the previous section, NVIDIA's role in shaping the broader ecosystem through platform-level dominance is also prominent. While the previous visualisation (Figure 2.7) emphasised connections between developers and platforms, Figure 2.6 provides a conceptual map of NVIDIA's position within the AI platform ecosystem.

Figure 2.8 illustrates the layered structure of technological reliance, with NVIDIA at the core enabling AI infrastructure across leading cloud platforms (AWS, Azure, and Google Cloud), which in turn provide environments for developers. The upward arrow from NVIDIA to 'AI SaaS Service' reflects NVIDIA's ongoing trajectory toward offering full-stack AI services directly, beyond just hardware or middleware. SaaS (Software-as-a-Service) refers to cloud-based applications delivered over the internet, allowing users to access powerful software tools without managing the underlying infrastructure (Cusumano, 2010; Mell & Grance, 2011). In the AI context, this includes services like model training, APIs, and low-code/no-code development platforms. NVIDIA's recent launch of NVIDIA AI Foundations and NIM (NVIDIA Inference Microservices) marks a concrete step in this direction, offering developers

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ready-to-use generative AI models and deployment tools via SaaS frameworks (NVIDIA, 2024a; 2024b). The directional arrows in the diagram thus visualise infrastructural layering and growing service centralisation, showing how developers and platforms rely increasingly on NVIDIA's standardised, packaged toolchains.

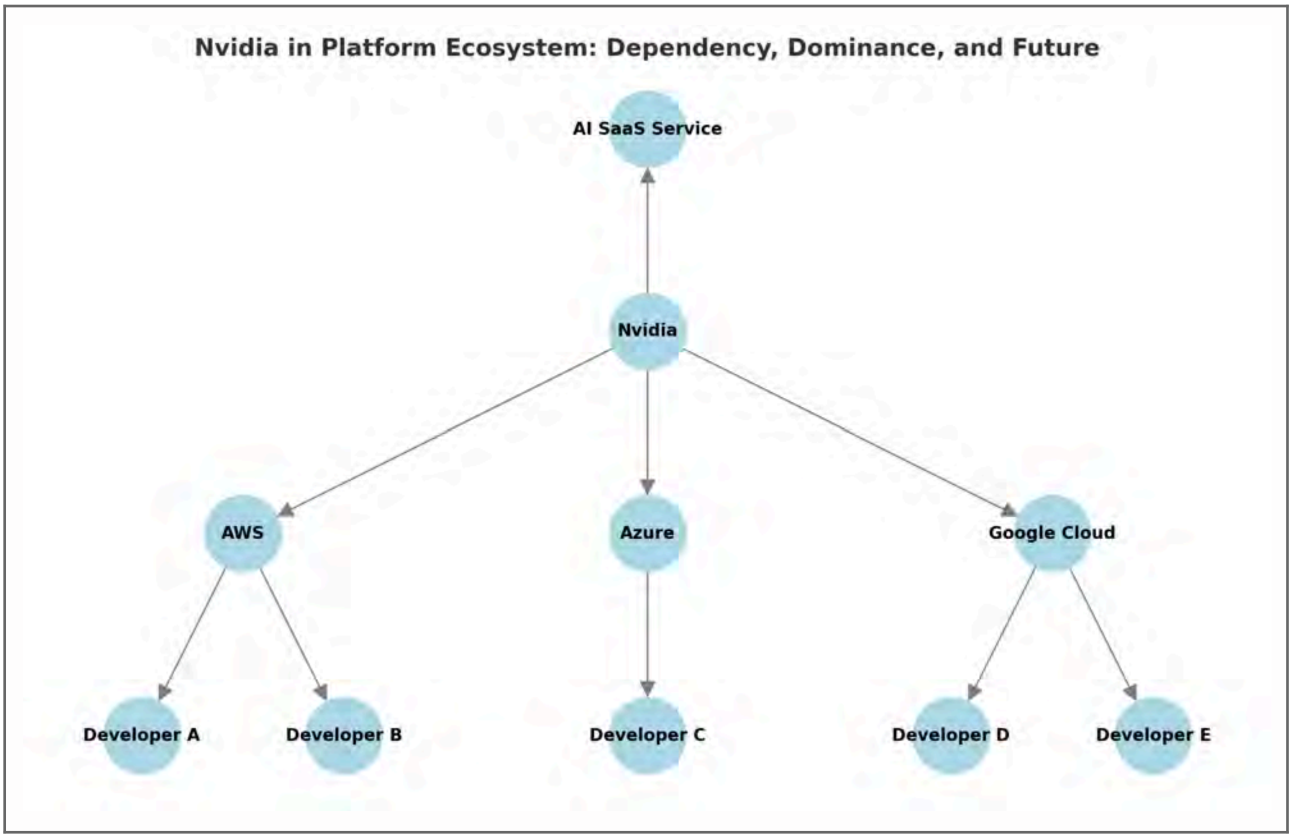

Figure 2.8. NVIDIA in Platform Ecosystem. This figure illustrates NVIDIA's expanding infrastructural position in the AI ecosystem by mapping its relationships with cloud platforms and developers. NVIDIA is at the heart of this, as it is no longer just a hardware manufacturer, but also a core infrastructure supplier that enables AI services across multiple layers. The arrows represent flows of technical enablement rather than ownership or direct service delivery.

From the perspective of the ecosystem, nodes such as those shown in Figure 2.7 reflect a high degree of structural embeddedness, operating as cross-platform bridges due to their modular and technologically neutral architecture (Baldwin & Clark, 2000). The enabler of this cross-platform compatibility and deployment is NVIDIA's unified GPU acceleration standards and tool stack (Barton et al., 2022), like CUDA, reinforcing its keystone role within AI-centric digital ecosystems (Ferrari, 2023). In other words, NVIDIA provides the technical foundation that allows these services to operate seamlessly across platforms, reflecting its platform-level dominance, as shown in Figure 2.8.

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NVIDIA provides GPU hardware and software frameworks (CUDA, TensorRT, etc.) to cloud platforms including AWS, Azure, and Google Cloud. These platforms integrate NVIDIA's stack into their infrastructure, making it accessible to developers through APIs, SDKs, or managed services. This configuration creates a layered dependency: cloud providers rely on NVIDIA to provide AI capabilities, and developers, in turn, rely on those platforms to access NVIDIA-powered environments. The 'AI SaaS Service' at the top of the figure represents a forward-looking trajectory rather than a completely completed configuration. It depicts NVIDIA's strategic shift toward full-stack services (NVIDIA AI Enterprise, NVIDIA AI Foundry), implying that the company may bypass traditional cloud intermediaries by providing ready-to-use model inference and API access directly to end users or enterprises, effectively becoming a service provider in its own right.

This dominance is further reinforced by NVIDIA's strategic shift toward services and platformisation. For example, NVIDIA AI Enterprise has become a standard deployment option on AWS and Azure. At the same time, Hugging Face has partnered with NVIDIA to integrate its Transformers models into NVIDIA's Triton Inference Server (Hugging Face & NVIDIA, 2024). This collaboration not only enhances deployment efficiency but also reinforces NVIDIA's role as a foundational 'AI runtime platform', a central infrastructure layer underpinning modern AI services across ecosystems.

Overall, the 3D network visualisation reveals NVIDIA's dual identity in the AI cloud services landscape. On one hand, NVIDIA provides indispensable foundational computing infrastructure for cloud platforms such as AWS and Azure, which rely on NVIDIA to power their AI capabilities. On the other hand, through the development of ecosystem toolchains like CUDA, TensorRT, and DeepStream, NVIDIA effectively shapes how developers can deploy and scale their AI services. As Cusumano et al. (2024) note, even though open source libraries[6] such as PyTorch, TensorFlow, and JAX largely shield application developers from directly programming against CUDA, these libraries have tended to be optimised for, and work best with, CUDA.

Although NVIDIA does not directly operate these platforms, it exerts firm control over the technical logic that runs within them, positioning itself as an 'invisible dominant force', or what can be termed infrastructural dominance. CUDA and its way of programming lead to effective platform lock-in and a winner-take-most outcome for NVIDIA hardware and software. As Parks and Starosielski (2015) note, media infrastructures are not neutral backends but powerful

[6] Open source library software in computer science provides an easier means for programmers to develop dynamic interfaces by storing readily accessible and frequently used routines and resources, such as classes, configuration data, documentation, help data, message templates, pre-written code and subroutines, type specifications, and values.

cultural and economic formations. CUDA, while invisible to most developers, structures how AI is built and deployed, while also exemplifying infrastructural control in the digital media ecosystem.

The notions of dependency and dominance in platform AI are not contradictory. Rather, they form a complementary and reinforcing relationship within NVIDIA's ecosystem. The platforms' dependency on NVIDIA enables the potential for dominance, while NVIDIA's dominance, in turn, deepens developer lock-in and strengthens the platforms' technical reliance. As Plantin et al. (2018) suggest, infrastructural platforms exert power not through coercion but by becoming technically indispensable. NVIDIA's CUDA and AI toolchains exemplify this infrastructural soft power.

Importantly, NVIDIA's platform power is not established through exclusivity, but through ecosystem openness, standardised tools, and cross-platform compatibility. This strategy enables NVIDIA to dominate without monopolising, offering shared infrastructure while maintaining strategic control, and thus defining a new model of non-exclusive yet central platform governance in the age of AI.

Mobile App Stores: Apple and Google Play

In this section, we investigate the emergence of AI apps in the most well-known and recognised mobile platforms, such as Google Play for Android and Apple's App Store for iOS (Zhu et al., 2024). These stores are responsible for the central distribution of small programmes known as 'apps', and they function as key infrastructures at the deployment layer of the AI ecosystem. They became significant after Apple introduced the iPhone in 2007, subsequently opening the platform up to third-party developers for creating and distributing their own applications (Gerlitz et al., 2019). While these apps may initially appear to be simple software programmes, they actually involve complex dynamics behind the scenes, such as how they are developed, promoted, and stored (Gerlitz et al., 2019).

Even though these platforms present themselves as a 'safe and reliable place' for exploring and downloading apps on the App Store's official website, they maintain control over which apps are downloaded, used and seen (Gerlitz et al., 2019: 7). Therefore, these stores position themselves as dominant actors, controlling which apps developers can offer, and how users access and engage with them. In doing so, they shape not only what technologies become available, but also how they are encountered and used. This governance over visibility and availability is not merely technical but cultural, with real consequences for how apps, and by extension, AI technologies, become embedded in everyday life. As apps are increasingly integrated into daily lives and digital routines as 'mundane objects' (Gerlitz et al., 2019), they increasingly shape our lives. Thus, rather than serving as neutral intermediaries, these platforms actively shape users' cultural, media, and content experiences, most notably in the context of AI and how the technology is both deployed and perceived.

Even though App Stores are one of the fastest-growing and culturally significant digital spaces, as Morris and Murray (2018) argue, they are, due to the small and everyday nature of apps, left understudied. By analysing which AI apps are surfaced across queries (*Visibility*), which developers appear most frequently (*Presence*), and how these apps are classified within store-defined genres (*Categorisation*), we observe how platforms curate the accessibility and positioning of AI technologies. In doing so, we foreground the app stores as not neutral distribution channels and as sites where platform logic organises the deployment and perception of AI technologies.

Apple Store and Google Play Store: Visibility, Presence, and Categorisation

As the most user-facing layer of the AI stack, mobile app stores, like the Apple App Store and Google Play Store, offer a key perspective on how AI is distributed in everyday life. To explore how AI manifests in this environment, we queried both stores using a set of AI-related search terms (Table 2.4). We then merged the results and analysed the combined dataset to examine which types of apps surface as a result of these queries.

Visibility: How Apps Surface Across AI-Related Queries

We identified multiple apps present in several search queries from these marketplaces. The top 10 apps appearing in the most queries across the Google Play Store and the Apple App Store are detailed in Figures 2.8 and 2.9 below. Each bar represents a single app, with the stacked colours indicating the queries through which the app was retrieved. In this context, we understand visibility as the number of distinct search queries through which an app can be found, as this shows how discoverable an app is within a given store's search architecture.

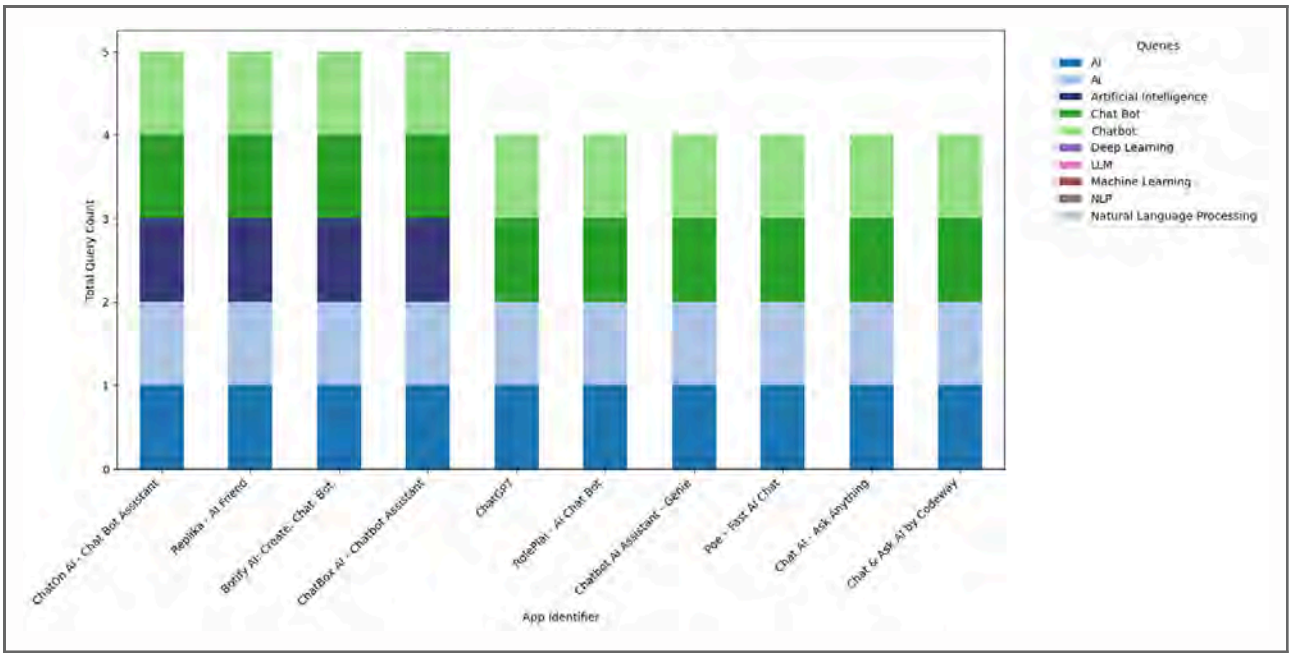

Figure 2.9. Top 10 Apps with Highest Query Overlap in the Apple App Store.

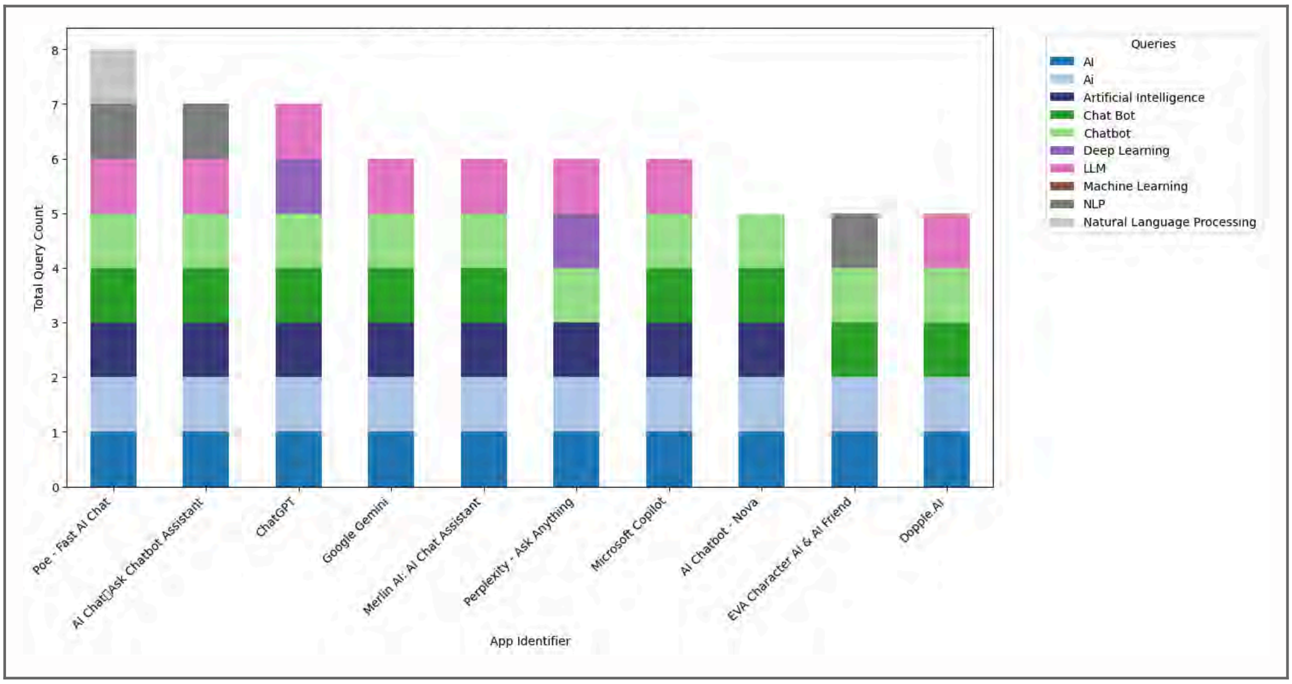

Figure 2.9. Top 10 Apps with Highest Query Overlap in the Google Play Store.

These visualisations offer a first indication of how app visibility differs between the two mobile marketplaces. For instance, differences in how apps are retrieved may be influenced by platform-specific metadata and indexing practices, as ‘the same app might appear in different stores with different descriptions, screenshots, permissions, and version numbers’ (Ali et al., 2017: 3). In the Google Play Store the same apps were found in up to eight different queries, whereas in the Apple App Store, the query overlap was much lower with the highest being just three or five queries. ChatGPT, which is one of the most visible apps in both, was found in 7 queries in the Play Store while only being found in 4 in the App Store.

This overlap was expected, as the queries were designed to capture variations of similar AI-related terms. What stands out is how inconsistently these variations return results. In the Apple App Store, for example, all top 10 apps are linked to either [AI] or [Chatbot]. The Apps *AI Chatbot* and *Genie*, however, seem to appear in the search using the variations [AI] and [Ai] but not under the written-out term [Artificial Intelligence]. Similarly, in the Google Play Store, *POE* appears in nearly every query, including both 'NLP' and 'Natural Language Processing', while apps like *Nova* and *AI Mirror* only appear under one of the two. These inconsistencies reveal what Rogers (2013) describes as the analytic value of variation in query design, which 'allows one to cast an eye onto the entire data set, making as a part of the analysis so-called long tail entities that previously would not have made the threshold' (Rogers, 2013: 6).

Measuring visibility by how frequently an app appears through different queries is only one way to understand how AI apps surface in these stores. To further examine how AI apps' presence is distributed structurally, we will now turn to the developers responsible for these apps.

Presence: Distribution of AI App Developers Across Stores

Building on the previous section, which focused on the visibility of individual apps through search results, we now examine the developers behind these applications. We analysed which developers appeared most frequently across all AI-related queries by counting which apps they have across both the Apple App Store and Google Play Store. The top 20 developers are shown by the number of apps in Figure 2.11 below. This provides information on which actors are actively contributing to these marketplaces with AI-labelled apps, implying their production volume and perhaps strategic placement in the appification of AI, even though it does not reflect popularity or performance.

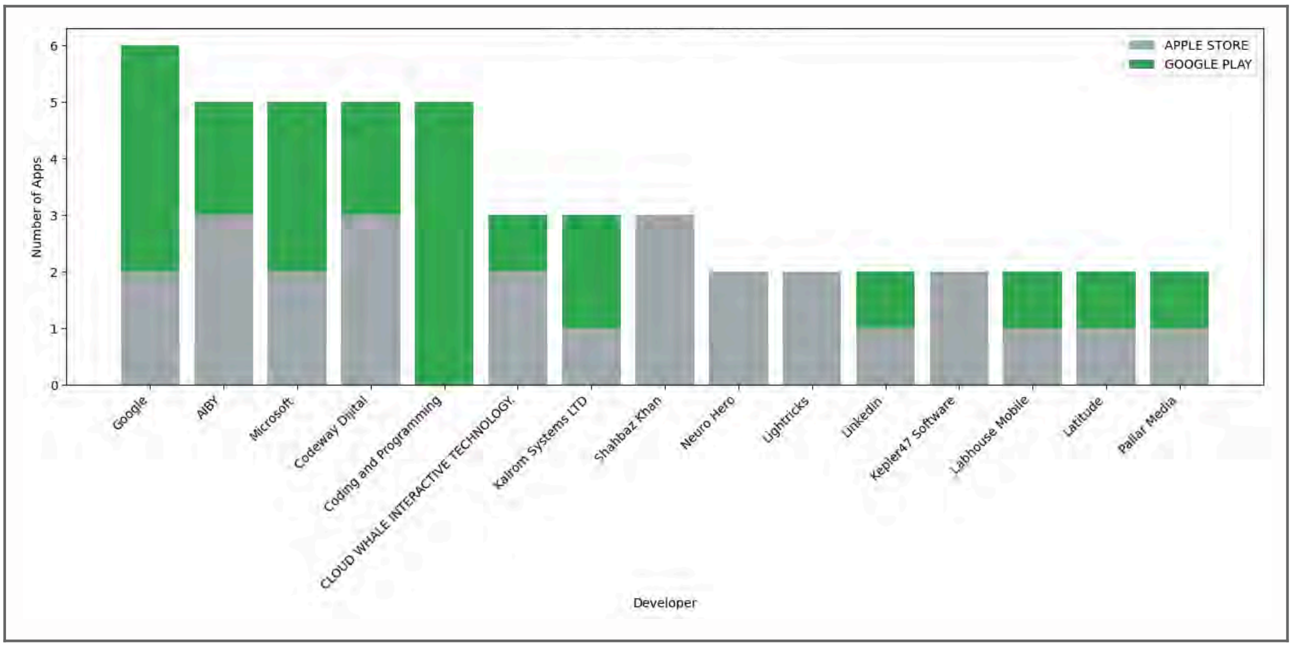

Figure 2.11. Top 15 Most Prolific AI App Developers Across Mobile Marketplaces.

Figure 2.11 illustrates how app developers contribute to the appification of AI across mobile marketplaces. We can see that there's a concentration of very few developers who actually have more than three apps across these marketplaces. Most of these developers maintain a presence across both the Apple App Store and Google Play Store, though some show a slight platform preference. For instance, Google has a stronger presence in its own Google Play Store, while still appearing in the Apple App Store. The presence of the major players, Google and Microsoft, is also present with apps in these marketplaces. This reflects not only cross-platform strategies but also how major infrastructure providers like Google and Microsoft extend their influence into consumer-facing app ecosystems.

Categorisation: Classification of AI Apps Within Store-Defined Genres

The classification of AI applications is influenced by both the App Stores and the developers that submit their applications. The act of categorising an app serves not only to organise it but also to frame user expectations, as developers' subjective labels may not always reflect actual app use (Liu et al., 2016: 1). An app placed for example in one of the categories 'Productivity', 'Games', or 'Travel', places the app within a very different framework to each other, which carries with it assumptions, use cases, and ways of it being used. In reality, however, many apps move between categories or resist such clear-cut distinctions, as existing classification systems are often too coarse or inflexible to capture the full scope of app functionality (Liu et al., 2016: 1). Both Apple and Google acknowledge this ambiguity, instructing developers to

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choose the category that 'best describes the main function or subject matter' of their app (Apple, 2025) or is 'most obviously relevant' (Google, 2025).

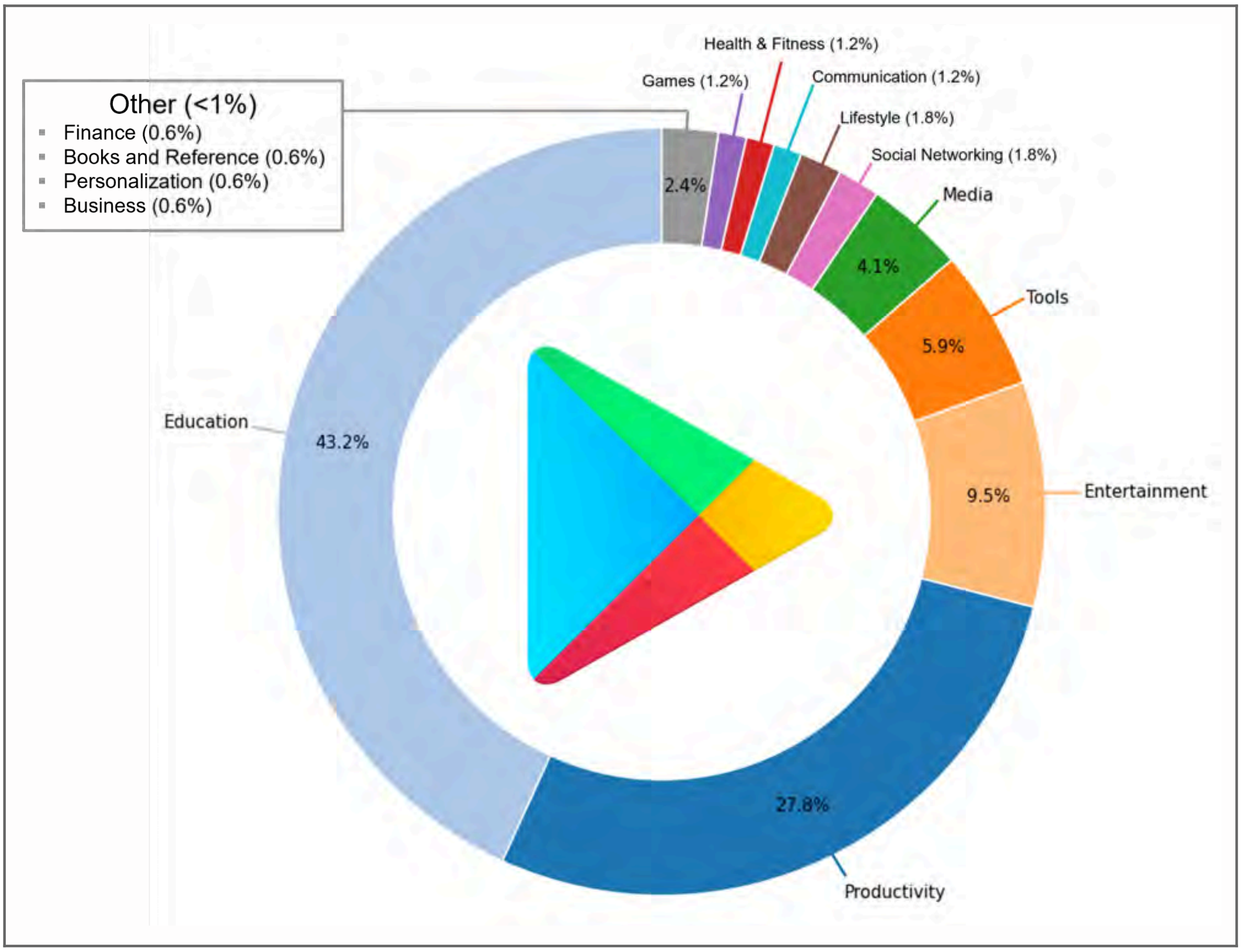

Figure 2.12. Category Composition of Queried AI Apps in the Google Play Store.

To explore how AI apps are framed through categorisation, we examined the genre distribution of all apps retrieved across our AI-related queries. We analysed the categories as a lens into how AI functionalities are embedded into existing domains of app use. Both stores use different words and formulations for the categories. Therefore, we cleaned and normalised the raw category labels to make meaningful comparisons, grouping similar genres into broader, comparable terms. The resulting visualisations present an overview of how AI-related apps are distributed across categories in each store.

The Google Play Store distribution of categories reveals a strong concentration of AI Apps in a few dominant genres. The three categories 'Education' (43%), 'Productivity' (27.8%), and 'Entertainment' (9.5%) account for more than 80% of the total app count. Smaller domains like 'Tools', 'Media', or 'Lifestyle' oriented apps make up a much smaller portion, all below 6%. This

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concentration in the Google Play Store indicates a functional framing of AI as a tool for learning, efficiency, and engagement.

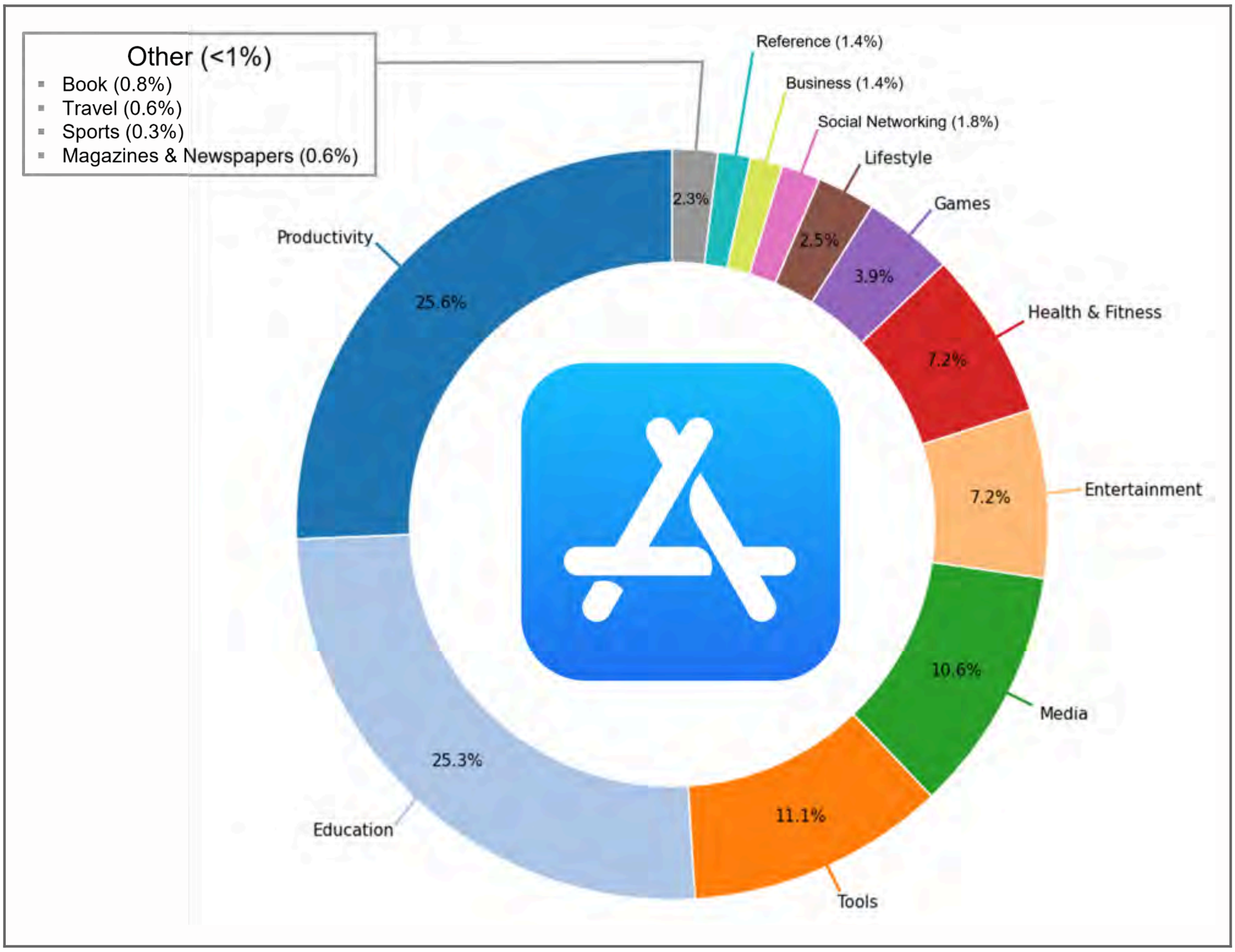

Figure 2.13. Category Composition of Queried AI Apps in the Apple App Store.

The genre distribution in Apple's App Store shows a slightly wider distribution of genres, while the areas of 'Productivity' (25.6%) and 'Education' (25.3%) dominate. 'Tools' (11.1%) and 'Media' (10.6%) play a more significant role here than in Google's platform, while Entertainment (7.2%) and 'Health & Fitness' (7.2%) also register more notable presences. The App Store thus reveals a broader but still functionality-oriented categorisation of AI apps.

This distribution highlights that the current appification of AI is anchored in areas of functional utility. 'Productivity' and 'Education' account for more than sixty percent (60.85%) of all AI app categorisations on both platforms, far outnumbering more affective or leisure-oriented genres such as 'Entertainment', 'Lifestyle', and 'Health & Fitness'. This categorical dominance illustrates not only how AI is currently being appified but also how it is expected to function as a performance-enhancing instrument integrated into professional and educational settings.

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These findings are consistent with broader societal narratives that present AI as a solution to efficiency and labour optimisation challenges. This vision is explicitly articulated in U.S. policy discourse. For example, in his speech at the White House Summit on Artificial Intelligence, Kratsios, then U.S. Chief Technology Officer and a key figure shaping national technology strategy, described AI as providing 'great benefits for American workers, with the potential to improve safety, increase productivity, and create new industries we can't yet imagine' (cited in Bareis & Katzenbach, 2021: 869). This vision of AI, however, has to be understood critically as it is not without pitfalls. Through the categorisation of AI apps in the App Stores, this AI imaginary is not just articulated but also operationalised into a multitude of apps. As a result, our graphs show not only a snapshot of the classification of AI but also a platform-curated understanding of its potential applications. When seen primarily in terms of education and productivity, this supports its function as a facilitator of learning and self-improvement, an engine driving the future economic order, as well as an enhancer of individual performance.

Case Studies

Codeway

In our analysis of the top 20 developers by app count (Figure 2.9), we found that *Codeway Digital Hizmetler Anonim Şirketi*, ranked second on the App Store and fourth on the Google Play Store, stood out as an interesting case to examine. Hence, we wanted to take a closer look at its role within the App Store ecosystem. Codeway is a technology focused on building AI-powered mobile apps in Turkey. They have a global presence, boasting 320 million users worldwide. Since 2020, the company has focused on AI-powered apps, 'to use the untapped potential of AI'. As a result, the company launched more than sixty AI-adopted products in the areas of photo editing, productivity, and entertainment, such as 'Learna AI' for learning English, 'Nerds AI' for homework assistants, and 'Couples' for better relationships (Codeway, 2025). Illustrated through their work on the 'Face Reenactment' method, which focuses on advancing 3D mesh-based deep learning methods for transferring face expressions and movements. They are also using LLMs for particular tasks, like a teaching assistant or language tutor (Codeway, 2025). This case demonstrates how emerging developers can take advantage of AI innovation to rapidly produce applications and establish a strong presence in the platform ecosystem.

POE – Fast AI Chat

After analysing the data collected from the Google Play store, we identified *POE – Fast AI Chat as the most visible app in that marketplace through our queries. As shown in Figure 2.10 above, POE appears first in terms of total query overlap,* appearing in eight out of ten queries. This shows that POE aligns best with our AI-focused search terms compared to other applications.

Quora developed POE, which is positioned as a 'common space' where users can chat with different major language models (LLMs) on a single platform. By selecting their preferred LLM, users can establish 'back-and-forth conversations' with these models and conduct multi-step conversations. POE provides users access to multiple LLMs, such as GPT-4, Claude 3, Gemini Pro, DALL-E 3, and more, in a single interface (Poe, 2025).

Although POE does not present itself as a super application, its package service overlaps with what Van der Vlist et al. (2024) have previously discussed about the 'super-appification' of apps. 'Super-appification' is the transformation of ordinary systems into multifunctional platforms that centralise various services, user interactions, and data flows into a single distribution (Van der Vlist et al., 2024). In fact, Poe's unification of multiple major language models under one roof reflects an early stage of this logic. Rather than providing just one function, POE controls multiple AI models.

This model is not unique to POE. Our analyses of the [Chatbot] query group found that multiple applications allow users to choose between different LLMs. Apps such as ChatBot AI, ChatOn, and ChatBox have a similar tendency to follow this trend. This situation indicates that there is a growing trend among AI apps to centralise services, moving toward a 'single app' experience. As such, POE exemplifies how the logic of super appification is taking hold in the AI app ecosystem, marking a shift toward new, embedded distribution models under the guise of convenience and versatility.

Model Marketplaces: OpenAI GPT Store

In this section, we explore the GPT Store, which is OpenAI's version of an app store that consists of apps similar to those in the previous section. The store hosts tailored chatbots built on top of the company's language model GPT-4. These GPTs function as apps used for specific tasks and are usually offered in 'AI assistants' or 'AI agents'. Within the space, we explore this ecosystem, recognising the role of the appification of AI models and larger infrastructural dependencies that are present within the space. While other companies have AI models allowing custom tailoring, the GPT Store is a multivalent platform that supports stakeholders like users, developers, and partners. Since the GPT Store is the most developed

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platform within the AI agent space and offers the most material to engage with, we focus on this ecosystem to explore how dynamics of dominance and dependence emerge. Underlying this section is a key tension: the GPT Store app creators depend not only on the foundational models for customisation but also on the platform that hosts and distributes their work.

Our analysis reveals consistent patterns within the GPT ecosystem, highlighting how the Store is largely shaped around practical, task-oriented categories such as Education (20.8%), Productivity (15.2%), and Research & Analysis (13.5%), as shown in Figure 2.15. This was demonstrated through the Internet Archive dataset, where we tracked how often specific GPTs appeared on the homepage over time. These frequently featured GPTs predominantly adopted helper roles, a pattern also reflected in the word cloud generated from the full GPT search dataset beyond the homepage. By analysing the descriptions of all GPTs in the larger dataset (Figure 2.14), we found recurring terms such as expert, 'assistant', 'advice', 'guide', 'help', and 'expert'. In this respect, the appified AI of GPTs can be culturally framed as a service worker or assistant for the everyday user. As previously discussed, AI can be integrated in different ways for daily use or serving enterprise needs. The GPT Store brings AI to the forefront, positioning GPTs as tools for personal use, customisation, and labour support, functioning as assistant-like agents designed to carry out specific tasks. Notably, the majority of these GPTs are built around goals of productivity and efficiency, reinforcing their role as everyday AI agents.

Figure 2.14. Top Words Used in GPT Descriptions. This figure is a collection of the most frequently used words in the dataset to describe the GTPs. The larger the word, the more it was used.

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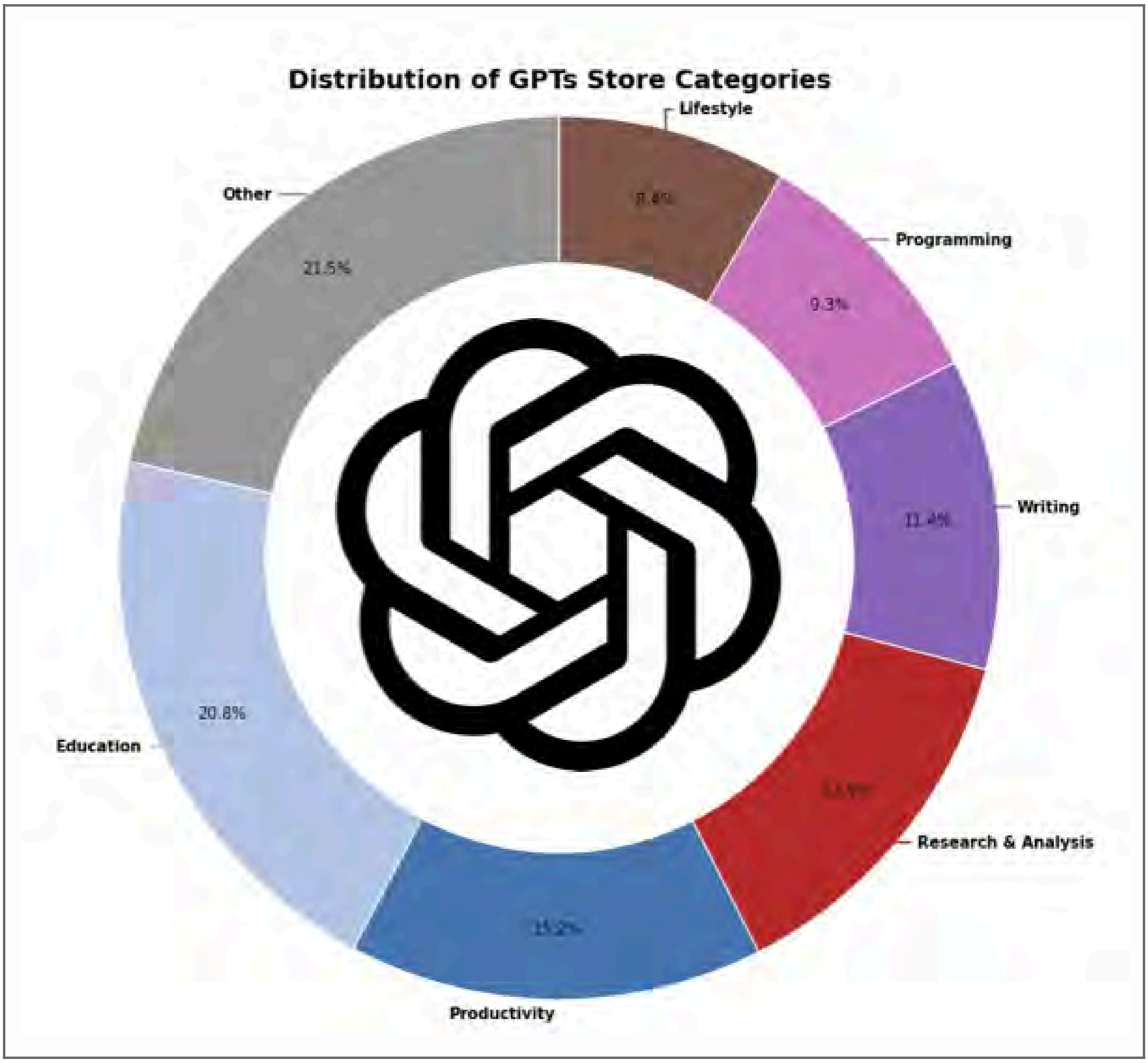

Figure 2.15. Distribution of GPT Store Categories. Top GPT categories shown here reflect the most frequently featured categories on the Store's homepage.

To further examine these themes, we turn to our GPT Store homepage dataset, captured via the Internet Archive, which reveals a consistent presence of AI agents embodying the assistant phenomenon. Top-performing GPTs like Write For Me, Scholar GPT, Canva, and Consensus are all focused on writing, education, and research, reinforcing the Store's emphasis on productivity-oriented use cases. The curated homepage reflects a clear marketplace logic, where visibility is largely reserved for GPTs positioned within a 'productive' field as seen in Figure 2.16. This indicates that the dominance within the homepage and wider desire to position task-oriented GPTs at the centre of the store, enforcing certain GPTs' dominance. In addition to third-party creators, we also observe how ChatGPT itself retains privileged visibility through its own 'featured GPTs', reiterating its own dominance in the platform.

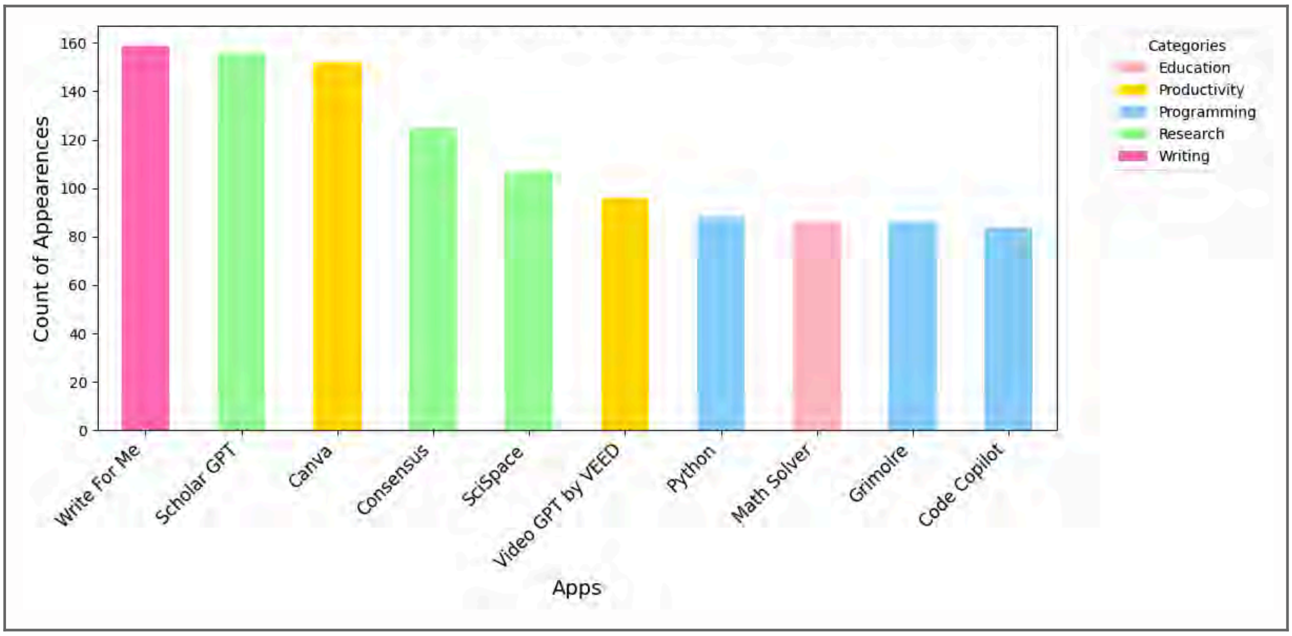

Figure 2.16. Top 10 Most Present GPTs on the Homepage.

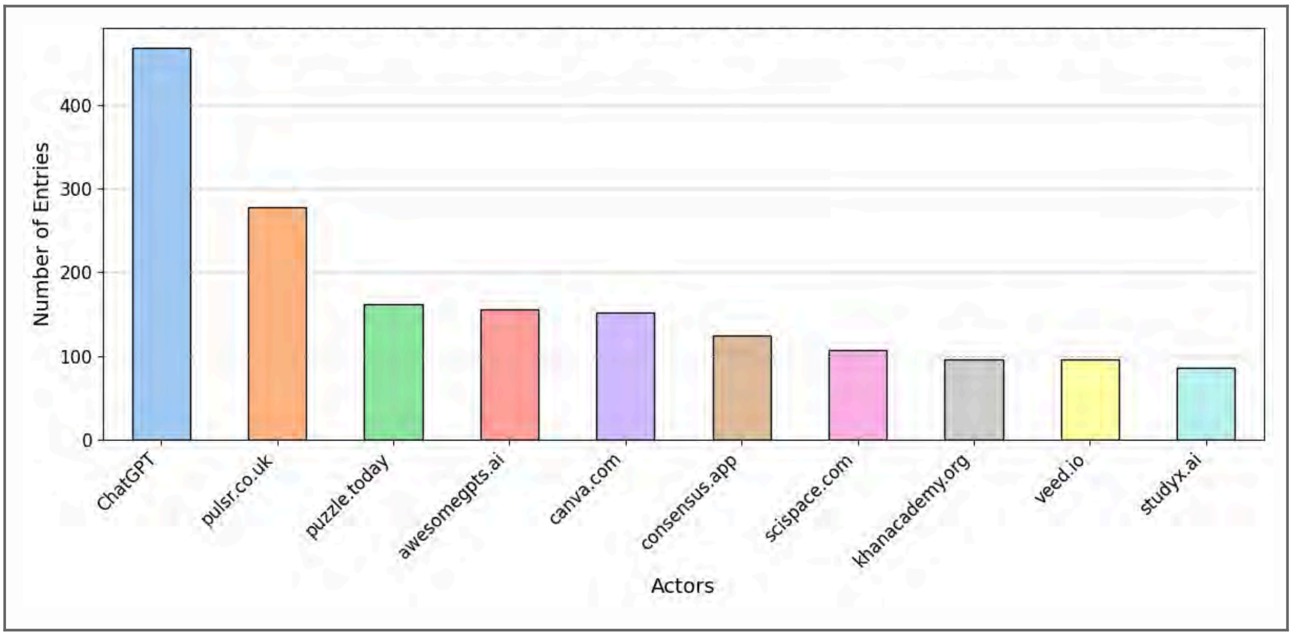

Figure 2.17. Top 10 Most Present Actors on the Homepage.

OpenAI GPT Store: Origins, Interface, and Platform Logics

In January 2024, OpenAI launched the GPT Store. The aim of the store is to allow the customisation of the standard chatbot and fine-tune its model to the needs of the community or users. As the platform states, ‘GPTs are a new way for anyone to create a tailored version of ChatGPT to be more helpful in their daily life, at specific tasks, at work, or at home – and then share that creation with others’ (OpenAI, 2023).

The customisation of these chatbots has resulted in an emerging marketplace of GPT applications that are monetised and available in the GPT Store for individual use. These GPT apps are accessed through the GPT Store interface that is similar to that of mobile App stores, consisting of categories, leaderboards, ratings, and conversation counts, making millions of GPTs available for use.

The GPT Store’s presentation is a familiar platform for users, yet its underlying infrastructure functions quite differently. While the GPT Store clearly draws inspiration from traditional app stores in its interface and ecosystem logic, it differs significantly in that all GPTs are built on a single underlying model, closed-source infrastructure, with creators structurally dependent on OpenAI for both the model’s infrastructure and the platform’s distribution (Luitse & Denkena, 2021). In other words, creators ‘[...] are required to rely on the ready-made commercial model’, offering them the opportunity to build on top of the model but do not have access to the model’s inner workings (Luitse & Denkena, 2021: 10).

To better understand the realities of the GPTs Store’s dominances and dependencies, it is crucial that we position the appearance of the store. The GPT Store is accessed through the ChatGPT sidebar and opens into a curated interface modelled after traditional app stores. Customised GPTs are organised into categories, with a search bar available for more specific queries. At the header of the page, users are shown the Top picks followed by the subsequent categories, Table 2.5 shows categories with their descriptions. Each GPT appears as a card (Figure 2.19) displaying key metadata, including user ratings, conversation counts, ranking within a category, and suggested conversation starters. These cards also provide prompt suggestions and indicate specific capabilities like web browsing, image generation, and code interpretation. It is important to note that all GPTs labelled ‘By ChatGPT’ lack metadata beyond their descriptions. This reinforces the platform’s control by privileging its own content within the store, while exempting these GPTs from user ratings and other forms of public evaluation.

Section	Description
Trending	Curated top picks from this week.
Feature	Most popular GPTs by the community.
By ChatGPT	GPTs created by the ChatGPT team.

Table 2.5. GPT Store ‘Top Picks’ Sections.

Category	Description
Writing	Enhance your writing with tools for creation, editing, and style refinement.
Productivity	Increase your efficiency.
Research & Analysis	Find, evaluate, interpret, and visualise information.
Education	Explore new ideas, revisit existing skills.
Lifestyle	Get tips on travel, workouts, style, food, and more.
Programming	Write code, debug, test, and learn.

Table 2.5. GPT Store Main Categories.

This curated interface reinforces ChatGPT's role as the gatekeeper of visibility, replicating the dynamics previously explored in the mobile app store ecosystems where platform owners set the conditions of discoverability. ChatGPT promotes the narrative that 'anyone can easily build their own GPT— no coding is required' (OpenAI, 2023). It also makes it a conversation of scale where there can be an app for anything developed by anyone, echoing the dynamics in mobile app stores. However, unlike traditional technical barriers to developing software to create apps in the mobile ecosystem, ChatGPT removes those barriers so anyone can fabricate a GPT app. While it is more accessible to generate apps, the GPT Store functions similarly to other app stores, like the Apple store, which hosts 'official or 'first-party' applications developed by Apple [while] also apps published by third-party developers' (Dieter et. al, 2019), as seen in the category 'By ChatGPT' and the other creators. The GPT Store exemplifies what Morris and Morris (2019) call the 'overproduction of failure' in the app ecosystem, where most apps or GPTs fail to gain traction while visibility is saturated among the apps that are platformed on the curated home page. To further these findings, we examine how the AI personas appear within the ecosystem, followed by case studies that examine some of the most successful GPTs to explore how dynamics of dominance and dependence operate within the ecosystem.

Roles Represented by GPTs

This section focuses on the 'roles' of GPTs to better understand the tasks, functions, and personas commonly assigned to AI agents, reflecting broader trends in the appification of AI. While GPTs do not have explicitly defined roles within the Store, we found it important to explore which roles were most commonly associated with them. We began with the 2024 dataset created by Weltevrede et al. (Van der Vlist et al., 2025), which assigned roles to GPTs featured on the Store's homepage. Building on this, we adopted the view that GPT roles can be inferred and analysed for deeper insights. We then applied this approach to our broader 2025 dataset, using the descriptions found on GPT 'cards' to assign roles based on language and intended functionality. These personas often appear as terms like 'travel planner' or 'legal advice', which signal each GPT's purpose. From our analysis, the most common roles included writers, programmers, teachers, and coaches.

Below, we review the 2024 and 2025 datasets to observe how GPTs continue to specialise, expand, and diversify. The findings presented in this section, seen in Tables 2.7 and 2.8, are the analysis focusing on the results of the Clusters (themes), Roles (persona labels), and Descriptions (insights into categorisation).

We first analysed the text in the 'description' and 'capabilities' columns to find words that resembled roles but were not part of our predefined 'known_roles' list. We focused on English words with suffixes like '-er', '-or', '-ist', and '-ian' that suggest role-like meanings, excluded stopwords, and saved the filtered terms in the 'new_roles_cleaned' column. This allowed us to surface recurring role-like terms not explicitly defined in the dataset.

Next, we combined all words from the 'new_roles_cleaned' column into a single list and counted their frequency. This helped us identify which new roles were meaningful and how they aligned with broader themes. We then manually grouped Weltevrede et al.'s roles into logical clusters, for example, a 'Coding' cluster ('programmer', 'developer', 'debugger') and a 'Writing' cluster ('writer', 'editor', ' summariser'). To expand these clusters, we integrated relevant terms from the 'new_roles_cleaned' list and created new thematic clusters where needed, such as 'Business & Management', 'Health & Wellness', 'Legal & Professional', and 'Sales & Marketing'. Tables 2.7 and 2.8 below show the distribution of roles across these clusters.

Cluster	Roles	Description
Coding	programmer, developer, debugger, creator, transformer, converter, copilot, wizard	Includes GPTs focused on software development, debugging, and code generation.
Writing	writer, editor, summariser, copywriter, storyteller, critic, humaniser	GPTs that assist with content creation, editing, and storytelling.
Design	designer, painter, visualiser	Tools for visual design, painting, and layout visualisation.
Support	assistant, buddy, companion,	Roles centred around assisting

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	partner, keeper, coach	users in personal or professional contexts.
Education	teacher, mentor, professor, guide	GPTs that function as educators, mentors, or academic guides.
Search & Research	searcher, finder, reader, browser, explainer, oracle	GPTs designed to help with finding, reading, and explaining information.
Consulting & Advisory	advisor, consultant, planner, expert	Experts offering advice and strategic planning.
Science & Logic	scientist, scholar, analyst	Roles involving analytical thinking and scientific exploration.
Mystic & Creative	astrologer, maven, caddy	GPTs with imaginative or metaphysical roles.
Special Skills Agents	chef, recommender, translator, negotiator, pilot, mixologist, generator, hero, thief	GPTs with niche skills like translation, negotiation, and culinary arts.

Table 2.7. Distribution of Roles Across Original Clusters.

Cluster	Roles	Description
Business & Management	business consultant, project manager, client advisor, career coach	Focused on organisational, client-oriented, and leadership roles.
Tech & Engineering	engineer, calculator, builder	GPTs simulating engineering and technical problem-solving.
Expand: Education	tutor, learner, student, trainer, instructor	New educator-type roles like tutors, students, and trainers.
Health & Wellness	therapist, fitness coach, wellness advisor, nutritionist, patient	Supportive roles related to physical and mental well-being.
Legal & Professional	lawyer, auditor, accountant, counsellor, administrator	Professional roles in law, finance, and administration.
Sales & Marketing	marketer, publisher, advertiser, seller, brand strategist	GPTs that market, sell, or promote products/services.
Expand: Writing	narrator, reviewer, speaker, interviewer	Narrative-driven roles expanding writing capabilities.
Expand: Design	illustrator, stylist, artist, decorator	Creative roles like styling, illustrating, and artistic direction.

Table 2.8. Distribution of Roles Across New/Expanded Clusters.

Figure 2.18 below shows the number of roles and their corresponding clusters. The Light Blue bars represent the clusters formed by the assigned roles based on known roles. The orange bars indicate clusters that include both existing and new roles, while the green bars represent new clusters derived from our dataset.

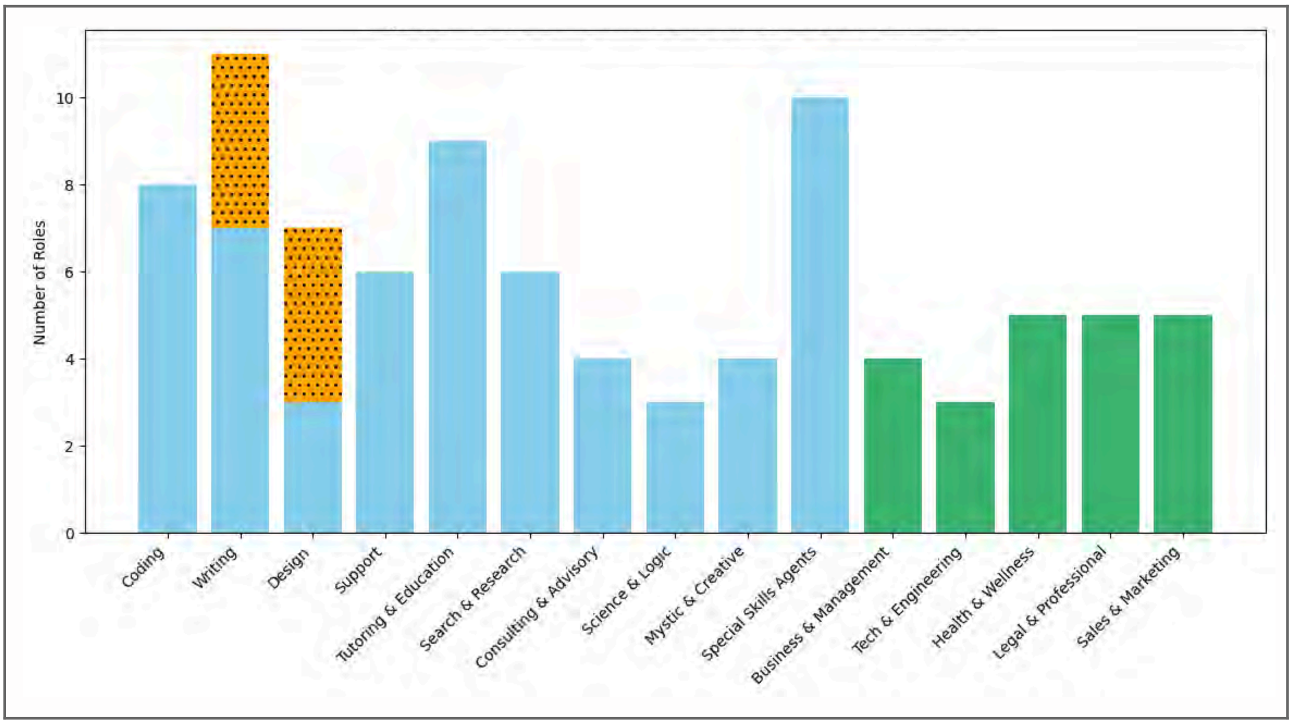

Figure 2.18. Comparison of Role Clusters (Original vs New/Expanded).

Our findings demonstrate that the GPT Store has evolved from general-purpose to specialised, industry-specific tasks. The early roles and clusters were broader in their scope. However, compared with the 'new clusters' from our expanded 2025 dataset, which reflects the growing number of GPTs in the ecosystem, our results show the emergence of more specialised professional roles. To illustrate, we observed new roles such as lawyers and therapists and domain-specific clusters like sales and marketing. While there are differences between the datasets, this shift suggests that GPT systems adapt to user demands by offering niche GPTs.

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Case Studies

DALL·E

DALL·E is a GPT developed by OpenAI to generate images from text prompts through the ChatGPT chatbot interface. DALL·E 1 was initially released in January 2021, using the GPT-3 architecture to produce images. Then, DALL·E 2 was improved in April 2022. DALL·E was hosted and interacted as its own platform within the OpenAI environment. However, in September 2023, the latest iteration of DALL·E 3 was integrated into the ChatGPT interface, which allowed users to collaborate with the model to refine prompts, generate detailed images, and interact with simple requests in an intuitive interface (OpenAI, 2023).

DALL·E was presented in the ecosystem as the top-performing or suggested GPT app in the 'By ChatGPT' category, the 'GPTs created by the ChatGPT team'. According to our data, the DALL·E GPT has remained at the number one seat in the 'By ChatGPT' category of the leaderboard (January–July 2024).

However, DALL·E functioned as more than just a GPT. The name 'DALL·E' also served as a category for image-generation GPTs from the store's launch until mid-May 2024, when it was removed. This removal created a dynamic where apps that had consistently appeared in the DALL·E category were left without a space to be platformed to users. For example, the app 'Photo Multiverse', previously categorised under 'DALL·E' and often featured in the 'Trending' section, was no longer displayed on the homepage. Figure 2.19 shows a consistent presence of Photo Multiverse competing well in the Store under the categories; however, without the DALL·E category, it does not place in any other category and seems unable to compete for visibility in different sections.

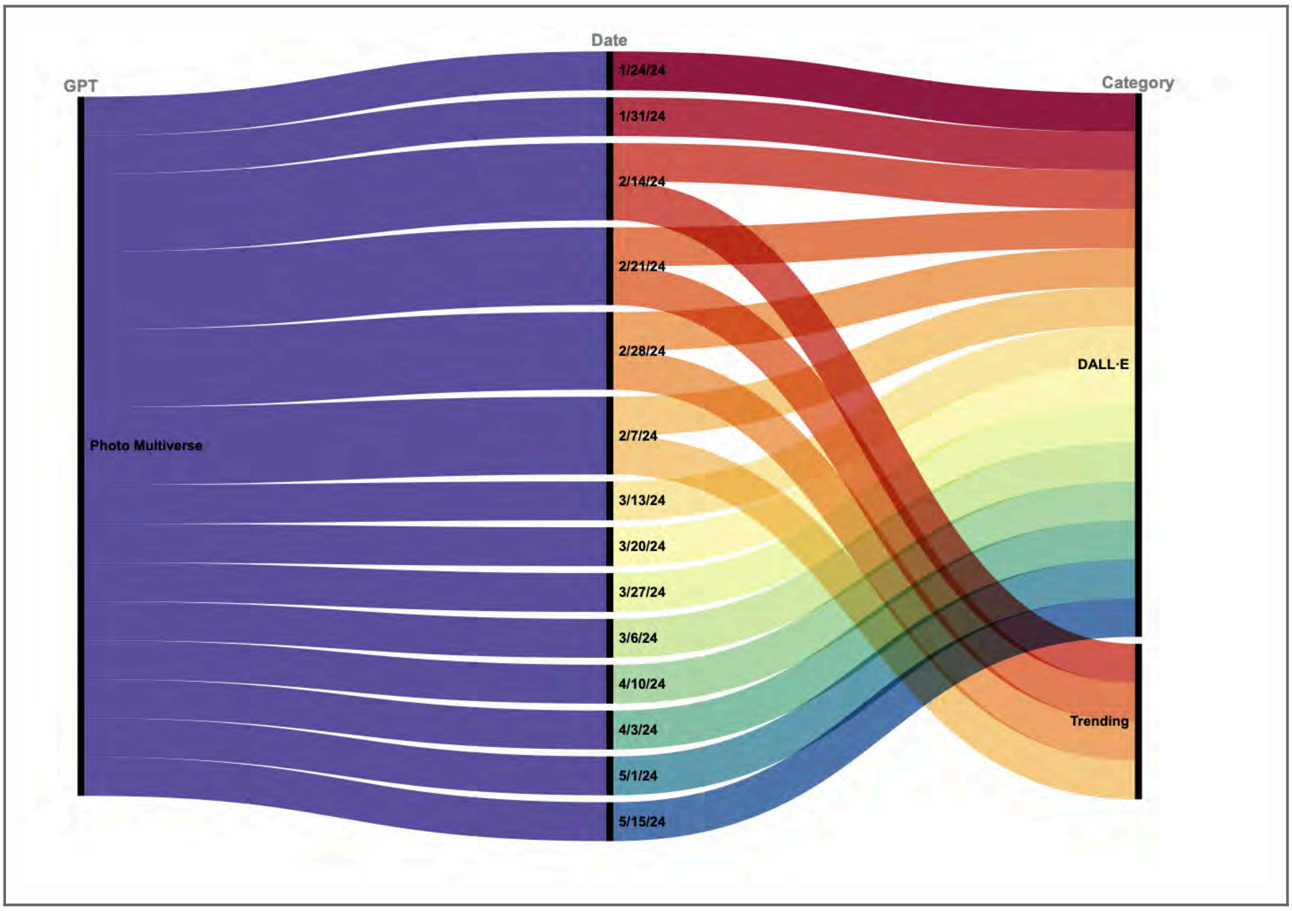

Figure 2.19. Consistent Appearance of Photo Multiverse in the DALL·E Category of the GPT Store Until DALL·E Category Removal. This figure demonstrates the GPT Photo Multiverse's presence on the homepage under the DALL·E category until after the category's removal in mid-May. Following this, Photo Multiverse was not featured in Trending or any other category on the GPT Homepage.

The case of DALL·E speaks to more extensive relations of dominance and dependence within the ecosystem. In one capacity, the model itself is central to the success of the entire GPT infrastructure. Every image-compatible GPT is built on top of OpenAI's DALL·E model for individual GPTs that opt for image generation, indicating its prominence within the ecosystem of all GPTs. Moreover, its (non)existence as a category further problematises which GPTs are visible and easily accessible to users.

Yam Chat

To identify the top-performing GPTs beyond those featured on the homepage, we queried our dataset of 84,913 GPTs scraped from the GPT platform. By combining two metadata points, rating count and conversation count, we created a popularity score, then subsequently ranked the GPTs. This method allowed us to rank GPTs in a way that considers both user satisfaction and usage frequency.

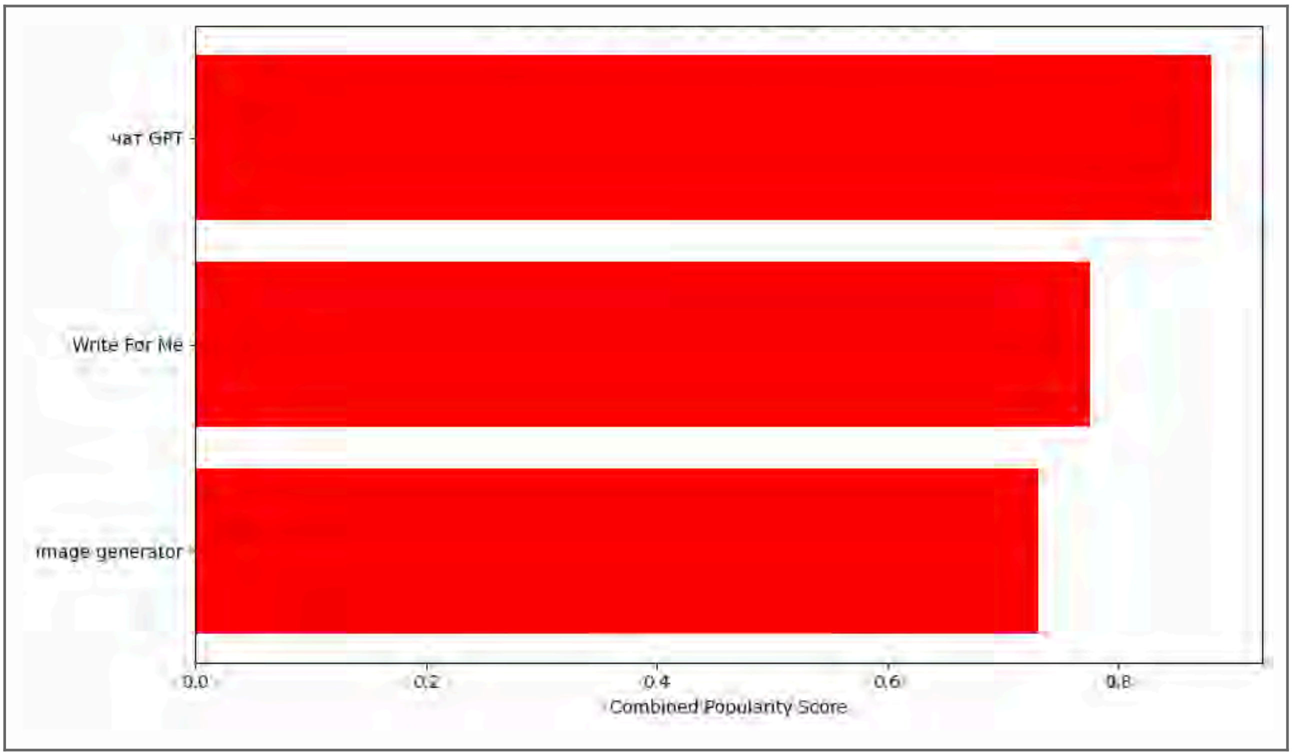

Figure 2.30. Top 3 GPT by Rating and Conversation Count.

To our surprise, *Чат chat* rose to the top, as seen in Figure 2.30. The Russian word meaning 'chat' signals its language specialisation, and the GPT's description simply states that it is 'optimised for Russians'. This is notable given that access to the OpenAI API is not officially supported in Russia (OpenAI, n.d.), suggesting that Russian-speaking users are still actively seeking out chatbots tailored to their language. More relevant to our research, however, is that despite its clear prominence in our dataset, this GPT has never appeared on the GPT Store homepage. This absence further emphasises the opacity of how ChatGPT determines rankings and curates visibility, highlighting how certain GPTs are surfaced while others, even highly used ones, remain off the homepage.

WriteForMe by Puzzle Today

Utilising the Internet Archive, we explored the GTP Store's homepage from May 4, 2024, to September 3, 2024. As a result of this analysis, *WriteForMe*, *Scholar GPT,* and *Canva* emerged as the top three apps with the most visibility.

The *WriteForMe* app, which appeared 160 times in the main categories and rankings in the top picks section of the homepage, exacerbates its prominence in our data. This application, created by Puzzle Today, stands out as a GPT designed to enhance writing skills. The app's description claims that it is designed for writing personalised, word-choice-oriented, and engaging articles. However, when we tried to find more information about the developer of Puzzle Today, we were unable to find any comprehensive information about this developer. While there is an option to link the developers' external website, LinkedIn, and X (formerly Twitter), they only provide their website. There is only one website for the company, and only a page featuring their GPTs is available. The developers' page has 21 available GPTs shown on their personal website; upon clicking on one of them, you are brought back to the ChatGPT interface using the GPT-specific mode (Puzzle Today, 2025).

Scholar GPT by Sider.ai

We analysed *Scholar GPT,* which is promoted as a tool for enhancing research from numerous sources and serving over 6 million users around the world. This GPT helps people to access academic information and synthesise existing academic information more easily and quickly. This synthesis benefits from academic resources such as Google Scholar, PubMed, bioRxiv, and arXiv. The developer behind Scholar GPT is Sider.ai, a company that aims to improve users' research processes, such as Scholar GPT, and uses AI to do this. The company's prominent features include Deep Research Agent, which enables users to automatically generate detailed report citations with visualised interactive reports. It also has a browser extension to summarise pages or YouTube videos. Apart from these, it offers the following tools to users: 'AI Video Shortener', 'AI Essay Writer', 'AI Image Generator', 'Background Remover & Changer', 'Photo Eraser', 'Text Remover', 'Inpaint Tool', 'Image Upscaler', 'AI Translator', 'Image and PDF Translator'. The use of these tools demonstrates that Sider.ai provides AI services for content production and editing for a variety of purposes other than academic purposes (Sider.ai, 2025).

Canva by Canva

Canva, originally developed to help individuals easily design social media posts, presentations, posters, and videos, is prominently positioned in the GPT Store, appearing at the top of the 'Lifestyle' category and in the 'Trending Featured' section on the homepage. Unlike many GPTs developed by smaller or lesser-known creators, Canva is already an established platform with a global presence. Founded in 2013 and headquartered in Sydney, the company now serves over 170 million monthly users. Its success doesn't rely on OpenAI's model, but its presence in the GPT Store extends its reach within the generative AI space. Known for making design accessible, Canva integrates with tools like Google Drive, Dropbox, and Slack, and offers

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AI-powered features like ‘Magic Design’ and ‘Magic Write’, along with real-time collaboration tools (Canva, 2025).

Discussion

Visibility: Platform-Driven Dominance

Within the context of the AI app ecosystem, visibility is not just about being seen. It is about being embedded within the discovery logic[7] of the platform itself (Van der Vlist et al., 2024). Visibility functions as a form of platform power across the Cloud Marketplaces, Mobile App Stores, and the GPT Store, shaping how certain actors rise to prominence while others remain more hidden.

In all three environments, visibility plays a central role in determining the success of AI applications. This is particularly evident in the *Mphasis* and *Write For Me* case studies, which illustrate how a consistent presence in the marketplace can translate into sustained exposure. Specifically, for apps like *Mphasis*, an early alignment allows not only the benefit of platform visibility but also the shaping of how associated services are categorised and displayed. Moreover, in the case of the GPT Store and mobile app stores, this appears in repetitive app styles and themes that influence categories and popularity. Early or strong influence of specific apps can contribute to what is known as platform-conditioned dominance, where structural advantage is not purely earned through merit, but through close alignment with the platform’s internal logic. Keywords also affect search results, as noted in the mobile app store searching ‘AI’ versus ‘artificial intelligence’ can yield different outcomes, suggesting that developers must strategically select associated terms to enhance visibility. This creates a competitive environment where third-party developers must either conform to the design norms established by dominant actors or attempt to find visibility through more niche application areas.

Specifically in the GPT Store and mobile app ecosystems, categories play a key role in shaping discoverability. The success and ranking of an app are often closely tied to the category in which it appears. Yet, none of these platforms publicly discloses the mechanisms behind their curation or recommendation systems. This lack of transparency becomes another expression of platform control, limiting the ability of creators to understand or influence the visibility of their own work.

[7] The rules, mechanisms, and structures that determine how content, services, or apps become visible and accessible to users on a digital platform.

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Infrastructure: Dependency & Entanglement

Beneath the interface layer is a complex web of cloud-based infrastructure, where power is increasingly centralised. Our findings reveal that actors such as NVIDIA have shifted from hardware vendors to infrastructure facilitators, deeply integrating themselves into the AI development and deployment pipeline.

Cloud platforms like AWS and Azure serve not just as hosting environments, but also as curatorial spaces for third-party solutions through their marketplaces. Developers such as Mphasis benefit from early integration and increased visibility by aligning with the platform taxonomy. In contrast, Apps4Rent employs a multi-platform strategy, assisting small-scale developers in accessing these infrastructures while also shaping dependency through managed services. Similarly, our findings in the GPT Store reveal that its own GPTs are dominant on the homepage. For example, the 'By ChatGPT' section features their own products. This situation creates an unequal competition between first-party and third-party developers.

This creates a layered structure of soft lock-in and infrastructural dominance. Developers become reliant on pre-integrated environments and toolkits, while platforms centralise power through compatibility and certification regimes. NVIDIA exemplifies this trend by embedding its runtime tools (CUDA and TensorRT) across platforms without owning the platforms themselves.

Categorisation: Framing AI's Purpose

The categorisation of the AI-apps is crucial to understand the organisation of the apps, what AI is used for, and how they frame user expectations. Across the spheres, especially in app stores and the GPTs, the most dominant categories appear as productivity and education. At first glance, this signals that AI is primarily utilised as a tool for time management, automation, and personal development. However, these two domains do not always show the real diversity of the AI functionalities. That is, apps with different functionalities, such as plant health, are also categorised in these dominant labels. Consequently, these categorisation choices shape expectations, discoverability, and perception of what AI is 'for'.

As a result, the categorisation of AI apps under labels like productivity and education limits the imagination of AI, hence shaping public perception towards AI. While AI, as an umbrella term, can be adapted across nearly all domains, this labelling shapes how they are utilised.

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End users tend to understand the usage of AI in these categories, which narrows their comprehension of its broader potential. In the broader sense, this situation is often interconnected with the neoliberal understanding of it as a performance-enhancing instrument integrated into professional and educational settings. It reinforces a particular AI imaginary where AI acts as a tool for improving oneself and pushes one to be more efficient by doing more.

Key Takeaways: Audience-Specific Perspectives

For Scholars

Through this report, we invite scholars of digital media, platform studies, and critical AI to consider app stores a vital place where artificial intelligence is materially and symbolically operationalised. Building on Helmond's (2015: 5) foundational concept of platformisation, defined as 'the rise of the platform as the dominant infrastructural and economic model of the social web', we have pointed out that this logic is now also being extended by Big Tech into artificial intelligence. Our findings resonate with Van der Vlist's call for empirical tracing of platform ecosystems to make the dynamics visible that govern the AI stack so it 'may be analysed, contextualised, critiqued, or regulated' (Van der Vlist, 2022: 330–331). Building on this, our study contributes to the wider understanding of the 'infrastructural control and governance' (Van der Vlist et al., 2022: 199) that these cloud marketplaces, mobile app stores, and emerging model stores have.

App stores function not only as distribution sites of the technology, but also as socio-technical filters, mediating which and how AI capabilities become accessible to users. We demonstrated this by showing that visibility is not always based on the merit of an app or developer, but is steered by search logics, metadata, and category taxonomies. The implications of this filtering become apparent in our study, which found a notable skew in app classifications, with a substantial 60.85% in the App Store and 36% in the GPT Store categorised as productivity or education, suggesting a potential channelling of AI accessibility towards specific functional domains.

Infrastructurally, the deployment of AI rests on a strategic 'app/infrastructure stack' (Gerlitz et al., 2019: 9) which, as Blanke and Pybus (2020) argue, is shaped by 'invisible and sometimes involuntary alliances, which signal the advanced technical dependencies'. The deep entanglement of these positions is a key finding of our analysis. We see this in how NVIDIA, despite lacking platform ownership, acts as a gatekeeper by embedding tools like CUDA across development pipelines. Simultaneously, OpenAI is leveraging its position as a model developer to build its own platform, where it prioritises its in-house GPT models at the deployment stage.

Through this report, we have shown how AI is defined, pushed, and pulled in different directions, and through what borders it needs to cross to reach us. By analysing how visibility logics, infrastructural dependencies, and strategic integrations intersect, we shed light on the material politics of AI. In doing so, we hope to expand the knowledge and make visible the invisible architectures of AI so that future scholars may build on this work to continue tracing the governance embedded in platform infrastructures, the economic incentives behind visibility hierarchies, and the long-term consequences of platformised AI control.

For Developers

Even though our findings are critical of the governance and dependencies that platforms impose within their respective spheres or layers, we also wish to highlight the opportunities that lie beneath. The appification of AI offers fertile ground for experimentation, enabling a wide range of actors to leverage these infrastructures for their businesses, applications, or workflows. For developers in particular, this landscape presents both challenges and strategic opportunities. Therefore, they must recognise that reaching their audience is mediated by these infrastructures and must therefore align with dominant genres and searchable queries. Our findings show that the term 'AI' may be too broad for individual apps to stand out, suggesting that more specialised niches could significantly improve visibility. While some actors achieve scale through sheer volume, others benefit from infrastructural ties or early-mover advantages. Thus, in the competitive environment of AI appification, strategic positioning, metadata, and searchability optimisation may become just as crucial as the app's functionality.

Additionally, we have shown that cloud services like AWS, Azure, or Google Cloud can provide scalability and convenience for implementing AI models, which require significant compute resources. However, this convenience can also create long-term dependency. If developers become entrenched in a particular environment, transitioning to another may prove to be both economically and technically challenging. Given these points, it is essential that developers take these dynamics into account when planning, launching, and scaling their AI-powered applications.

For Journalists, NGOs, and Policymakers

AI's growing presence in everyday apps is not just a story of technological innovation, but of infrastructural power and narrative control. These platforms, where users can gain access to AI in the form of Cloud Services, Apps, or personalised models, present themselves as neutral spaces where users and developers can interact. They do, however, have increasing power over this interaction. They control how apps are presented and how they are framed, and in the context of AI, they shape what AI is for through this curation. They shape what problem it is supposed to solve, who it is made for, and which futures it enables. Visibility within these environments is not organic, but carefully engineered through algorithmic rankings, partnerships, and editorial curation or infrastructural embedding, favouring certain actors and narratives over others. Additionally, infrastructure providers like NVIDIA or AWS are often absent from public debates around AI accountability. These companies shape not only what AI can do, but also who gets to build it. As such, these platforms must be critically investigated, not only as intermediaries but also as actors and governing bodies in the context of AI.

Future Research

This report provides an initial mapping of the appification of AI and the prominent spheres within its ecosystem (cloud platforms, mobile app stores, and the GPT Store), highlighting the structural dynamics of visibility, dominance, and infrastructural dependence present within them.

That being said, several key areas remain under-examined and warrant further investigation for future researchers and academics:

Looking Beyond Western Platforms

This report focused on Western-based platforms (AWS, Google Cloud, etc.), and while these platforms are globally influential, they do not fully contextualise the dynamic of AI app ecosystems. To aid this contextualisation, future research should explore non-Western platforms and infrastructures (Huawei AppGallery, Tencent Cloud, Alibaba Cloud, etc.). Further research into these ecosystems may reflect different platform governance models, cultural framings of AI, or dynamics of dominance and dependence, potentially challenging the Western-centric infrastructure bias present within current research findings. Thus, the

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geographic scope of the research is expanded in search of a more inclusive and critical account of the global appification of AI.

Expanding Query Design for Greater Coverage

While this project employed a deliberately curated set of search queries to surface AI-related apps and services, our analysis revealed that small variations in phrasing can dramatically affect service/app visibility within digital marketplaces. For future research, broadening the range of queries into a more nuanced set would not only improve the dataset's richness but also further expose the intricate strategies developers use to align with platform discovery logic. Thus, taking a more expansive approach to query design would enhance methodological robustness and ultimately reduce bias in app discovery across the different spheres.

Longitudinal Tracking of Dominance and Dependency

While this report offers an insightful snapshot of the dominant actors and their dependencies across different layers of the AI ecosystem and its spheres, these relevant platform dynamics are fluid and constantly evolving. Hence, repeating this study over time and using the same methodology to trace shifts within the spheres may offer insight into the dynamics at play within the ecosystem. Potentially tracking the newfound emergence or decline of dominant players, changes in how platforms structure their marketplaces, and the development of new dependencies or platform discovery logic strategies. Tracking these changes would offer valuable insights into the temporal dynamics of platform power and could then be visualised to show the progression of the ecosystem over time.

Investigating the Ethical Legitimacy of Power Structures

Asymmetries in power and access were illuminated across the different spheres of the ecosystem, where a small number of infrastructural and platform actors (AWS, Microsoft, Google, OpenAI, etc.) hold disproportionate influence over how AI services are created, distributed, and accessed within the platforms. Future research could critically examine the ethical implications of these monopolistic/oligopolistic dynamics. Raising questions around access, fairness, accountability, and regulatory intervention, such as: Who gets to build? Who gets to be seen? What happens when access is gated by infrastructure pricing, ranking algorithms, or discovery logic? A critical evaluation of the ecosystem, through an ethical lens,

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will allow for the assessment of the legitimacy and societal implications of dominance and dependency within these appified AI ecosystems.

Why This Matters

Finally, for future academics and media researchers, pursuing these questions will not only deepen empirical insight but also provide more politically and ethically aware mappings of these emerging digital infrastructures. As these AI systems become increasingly integrated into app ecosystems, the need for critical, comparative, and reflexive research will continue to grow. Expanding the scope, refining the methods, and scrutinising the consequences of infrastructural dominance and dependence will be essential for understanding and shaping the future of AI-powered platforms.

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Data Availability

The data that support the findings of this study are openly available in the Open Science Framework (OSF) at https://doi.org/10.17605/osf.io/hv34x (under 'Files' 〉 'Data Depositions').

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Spring Sprint

3 Religion

Worshipping (Through) AI

How AI Is Appifying Religious Practices

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Abstract

Artificial intelligence and mobile apps have become increasingly embedded in everyday life. AI apps occupy a critical intersection: as AI becomes a routine part of technology and the appification of society deepens, they appear across nearly all app categories—including religion. While religious AI and apps have been studied individually, little attention has been paid to the broader religious AI app landscape across different stores. Religion is particularly relevant in relation to technology, as technological mediation can reshape belief and practice. This study examines how AI is integrated into religious apps across three US app stores—Apple App Store, Google Play, and OpenAI's GPT Store—by analysing the descriptions of over 300 apps. We ask: *How is AI shaping the religion app landscape, and what are the implications for religious practice?* Our analysis identifies how AI is framed and operationalised, and what kinds of religious engagement these apps facilitate.

Keywords: appification · artificial intelligence (AI) · app store studies · religion · spiritual practices · AI chatbots

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Key Points and Findings

- Identifies emerging AI-driven religious functions, including chat-based agents, AI personas, and algorithmic spiritual guidance.
- Reveals a rhetoric of AI appification, yet non-AI apps continue to coexist, particularly on Google Play.
- AI introduces new forms of personalised spiritual engagement via generative content, customisation, and text interaction.
- Highlights a shift toward individualised spirituality over communal practice.
- Raises concerns about the commodification of religion through monetisation strategies.

Introduction

> 'We in no way, shape, or form, claim that these answers are from God.'
> — Bible Answers AI - Bible GPT (BIBLE ANSWERS AI, LLC, 2024)

This disclaimer, found in the description of an AI-powered religious app, encapsulates a key tension at the heart of our inquiry: What happens when artificial intelligence begins to mediate spiritual guidance through apps? As AI tools increasingly permeate everyday life, their integration into religious practices introduces new forms of mediation that challenge longstanding notions of faith, authority, and community (Campbell and Evolvi, 2019). From Bible chatbots to AI-generated prayers and religious journaling companions, religious apps now offer personalised spiritual experiences on demand. This shift occurs within a broader 'appified' culture where digital tools increasingly define how individuals engage with self-improvement, identity, and belief (Goggin, 2021; Morris and Murray, 2018).

The field of digital religion has long recognised how faith adapts to new media, often in hybrid and negotiated ways (Helland, 2016; Campbell and Evolvi, 2019). At the same time, recent scholarly debates have warned of the epistemic and ethical risks involved when AI becomes a vessel for spiritual insight (Singler, 2025; Alkhouri, 2024). As digital-natured 'Religion 2.0' (Cheong, 2014) continues to evolve, questions arise about authenticity, commodification, and the individualisation of belief. The automation of religious authority through chatbots or large language models blurs the lines between technological simulation and genuine spiritual experience. Meanwhile, commercial platforms like the Apple App Store

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and Google Play operate not merely as neutral distributors but as active curators of religious content, shaping how faith is accessed and experienced in the digital age (Dieter et al., 2019).

Despite this rapidly evolving terrain, little research has been done on how AI specifically shapes the religious app landscape—what functions are offered, how AI is framed, and what kinds of religious experiences are promised. This report addresses this gap by analysing apps across the Apple App Store, Google Play, and the OpenAI GPT Store. We aim to understand not just how AI is implemented, but how it is imagined and operationalised in the context of religious practice through our research question: *In what ways does the integration of AI shape the religion app landscape, and how does it impact religious practices?* We explore the intersection of technology and belief, examining how AI transforms the structure and the spirit of religious engagement in the age of apps.

Literature Review and Positioning

Inherently tied to their user culture, apps have been widely defined as 'software applications for mobile devices' (Fagerjord, 2015: 94) as well as 'nodes in larger networked media industries' that shape how culture is produced, disseminated and enacted (Morris and Murray, 2018: 3). Their device-based omnipresence illustrates apps' simultaneous extension into venues of economy, politics, values and the society, operating as 'social laboratories' through commodification of culture that ought to be perceived *skeptically* (Goggin, 2021: 5). Such an approach invites a way of looking at apps' infrastructure as one that affects users' everyday life and shaping social norms in an experimentative nature, often first motivated by commercial opportunities than by societal impact or existing issues. This perspective falls under a broader conceptualisation of 'appification', a process where the language and logic of mobile applications become integrated into the daily life of users while recording or creating their social realities as app-based data with potential for commodification (Dieter et al., 2019; Gerlitz et al., 2019; Goggin, 2021; Morris and Murray, 2018).

While broader research on app infrastructures and appification exists within app studies, there is little to no literature specifically on religious apps in this field. Yet, relevant work on religious apps already exists in other adjacent fields, such as Human-Computer Interaction (HCI) and religious studies. In 2013, Buie and Blythe (2013) argued that while many spirituality apps are produced, more scholarly attention needs to be paid to these in the field of HCI. They noticed an element of 'techno-spirituality' in apps that foster education, prayer exchanges, faith comparison, and everyday guidance, urging for greater academic engagement of the field with religion. Meanwhile, attention towards apps and their effect on

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spiritual practices emerged from the other academic direction. Around the same time, mobile apps and their impact on spiritual practices have become an object of study for religious studies. There, the arrival of religion-oriented apps was conceptualised as 'Religion 2.0' (Cheong, 2014) and produced new conditions for *mediating religion* where religion unobtrusively blends with the digital (Helland, 2016). In other words, '[r]eligion has embraced mobile apps[8]' (Bosch and Micó, 2023: 511).

As a widely adopted approach, digital religion is subject to empirical studies on how religious apps become positively integrated into current religious practices by the church (Cheong, 2014) and how they facilitate a certain degree of freedom in individual spiritual practice (Helland, 2016) while transforming its material and spatial dimensions (Evolvi, 2021). Campbell and Evolvi (2019: 2) further defined the goal of digital religion research as the 'exploration of the connection and interrelation between online and offline religious contexts and how these contexts become bridged, blended, and blurred over time' (as cited in Campbell, 2012).

Within this digital religion research agenda, scholars have argued that spiritualistic apps transform religion into an individual experience and less of a community matter (Rinker et al., 2016). This contributes to the discourse of privatising religion within the secularisation movement of the late 20th century, when religion became detached from the state, economy, and science (Casanova, 2006).

Accounting for the authenticity of app-mediated religious practices, Wagner (2012) analysed religious apps on Apple's App Store and categorised them in a six-class taxonomy—prayer apps, ritual apps, sacred text apps, religious social media apps, self-expression apps, and focusing/meditation apps. Campbell et al.'s (2014) empirical study of Apple's App Store similarly produced a typology of religious apps based on the common characteristics of their dominant design features. Highlighting the app store's limited categorisation of religious apps, this typology analysed app-related assumptions around religious practices. It produced eleven app categories for the five most prevalent religions—prayer, focus/meditation, ritual, sacred textual engagement, devotional worship, religious utilities, religious social media, religious games, religious wisdom and leaders, religious media outlets, and religious apps for kids (Campbell et al., 2014). A short study on app ecologies in Google Play also demonstrated how 'religion apps' are ordered and presented to users through the respective religion they promote and as tools that assist believers in different ways in religious practice (Helmond et al., 2015). Our study positions

[8] 'Religion' here means both the (digital) religion studies and religion as a spiritual practice and a system of faith as an inherent part of our societies.

itself to extend these existing typology-based frameworks to include AI-specific innovations within the context of the religious app market of both app stores.

More recent literature on religious apps sheds light on the issue of agency when hidden automated processes, such as religion's datafication through algorithms, artificial intelligence, and machine learning, become integrated into the app interface and app store markets (Goggin, 2021). In *Religion and Artificial Intelligence*, Singler (2025) uncovers the machine learning methods that enable specific app features, arguing that in religious apps, GPT or LLM models are adopted for both epistemic tasks and spiritual experiences[9].

As AI works with scriptures, religious principles, and philosophy (Alkhouri, 2024), these religious apps have seamlessly become normalised as a source for 'moral principles and existential reasoning' (Scott, 2016; Preda, 2024: 119) which weakens believers' participation in religious ceremonies, trust in the transcendental and globally 'erodes the utilitarian value of religion' (Scott, 2016; Preda, 2024: 119). Biana's (2024) feminist critique of religious AI chatbots emphasises the immediacy of moral and religious thoughts that these tools bring, while emphasising their hiddenness that makes the speech of these chatbots less scrutinised than statements of physical religious officials.

Most analyses of religious apps emphasised how commercial interests are part of their mode of operation and shape religious practices by prioritising certain technology engagements and interactions over others to maintain their control over data to maximise profits (Cheong, 2020; Singler, 2025). Similarly, app stores that function as markets for showcasing applications are equally central to their success (Morris and Murray, 2018). As dominant actors in the market landscape, Apple App Store and Google Play set the conditions for apps to survive in a controlled network of computing facilities, sensors, and distribution rules (Morris and Murray, 2018; Fagerjord, 2015). In other words, app stores as a crucial part of broader platform ecosystems 'regulate the distribution of cultural content and shape how millions of people interact with information and communication technologies' (Joseph et al., 2023: 7258).

[9] *Epistemic tasks* performed by AI models are for example 'providing general or logistical information about a religion; answering theological or ethical questions on which there are clear established answers within a tradition; or writing the more day-to-day texts of a religious institution's bureaucracy' (Singler, 2025: 66). *Spiritual experiences* are defined by a feeling of genuineness in a spiritual moment, still potentially performative (Singler, 2025).

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Data and Methods

Previous research has highlighted app stores like Google Play and Apple App Store as key entry points for app analysis since they function as the main 'gatekeepers' for the distribution and downloading of apps (Dieter et al., 2019: 2). Studying both stores can be done as a comparison, but it can also be used as a method to gather a broader range of Android and iOS apps (Gerlitz et al., 2019). While our study aims to compare the presence of religious AI apps between Google Play and Apple App Store, gathering app information from both also gives us a fuller data set. Our study focuses on several app stores in one specific country rather than one app store in several countries to get a deeper overview of the app landscape of a specific country rather than a broad overview of apps worldwide. The Apple App Store and Google Play were chosen since they are the two most popular app stores globally and have already been studied in similar research (Dieter et al., 2019; Dieter et al., 2021; Gerlitz et al., 2019). We chose the US stores specifically because the country forms one of the largest app markets globally, where many apps are originally launched, and because keeping the language in English facilitated our research (Numminen et al., 2022).

Since our focus on apps is tailored to AI apps, we decided to also include the OpenAI GPT Store, a recent significant addition to the app store landscape, which can provide insight into AI-specific app stores (Zhang et al., 2024). Studying apps that use AI is increasingly relevant with the 'appification' of AI, meaning how AI becomes deeply ingrained in daily life through its involvement in apps (Van der Vliest et al., 2025). While Van der Vliest et al. study AI app infrastructures in three different types of 'app ecosystems': mobile app stores, OpenAI's GPT Store, and cloud platform marketplaces, taking the scope of this paper into account, our paper has a narrower focus on religious apps across the first two.

However, studying app stores does not need to exclusively focus on the app stores themselves, but it also offers opportunities to analyse collections of apps through the use of queries (Dieter et al., 2019; Gerlitz et al., 2019). This is a useful alternative to methods focused on studying individual apps, e.g., a walkthrough method of an app's interface (Dieter et al., 2019). In addition, app titles and descriptions appearing in the app stores offer opportunities to study app features and functionalities. App descriptions can be a particularly fruitful starting point for manual categorisation through inductive coding, since most of the app information is written by the developers themselves and therefore highlights the main functions of the apps as seen by the developers (Dieter et al., 2019; Gerlitz et al., 2019). Following a similar approach as Gerlitz et al. (2019), we manually coded the dataset through

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analysis of the descriptions by focusing on aspects relevant to our research question, focused on AI integration in the religious app landscape.

We selected our queries by building upon the 'technicity of religion' (Helmond et al., 2015) and focusing on the five big religions, Christianity, Islam, Buddhism, Hinduism, and Judaism, adding a more general query of 'Religion'. Since our focus remained on apps which may include artificial intelligence, we decided to add 'ai' to the queries (e.g., 'ai religion', 'ai buddhism' etc.) for the Apple App store and the Google Play Store, and the same queries without the 'ai' for the GPT Store (apps in the OpenAI GPT Store are always linked to AI). Hereunder, the data collection and methodology are first explained for the Apple App Store and Google Play Store, and thereafter the GPT Store, since the methods differed slightly between them.

Apple and Google App Stores

For the Apple App Store and the Google Play Store, we gathered the data through the App Studies Initiative's instance of 4CAT—the ASI/DMI 4CAT App Studies Capture & Analysis Toolkit—by querying the chosen terms in the US stores. The 4CAT tool framework is useful for this because it functions both as a data scraper for specific app stores (i.e., the App Studies Initiative's instance and modules), but also as a general tool to analyse the data gathered through, for example, image extraction or word filtering (Peeters and Hagen, 2022). We downloaded the newly collected datasets from 4CAT into a shared sheet, which we cleaned up by deleting columns of data we deemed unnecessary for our research focus. The most important columns were the name of the app, the app developer, and the app description, building upon Dieter et al.'s argument that app names and descriptions offer a good starting point to study app features (2021). Thereafter, we manually went through the apps, marking those not connected to religion as irrelevant. This resulted in a final dataset of the religious app landscape with 125 apps total for Apple and 160 for Google, as seen in Figure 3.1.

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Figure 3.1. App icons of Google and Apple datasets for specific religion queries.

For a general overview of the dataset, we started coding by looking specifically at the app descriptions, copy-pasting relevant words and sentences into the new columns 'features', 'verbs', and 'other'. The features and verbs were meant to show what the apps do and how they want users to use them, and 'other' was a space to add quotes deemed especially interesting or confusing for further discussion. There were also columns for personas (yes/no + the name of the persona) and monetisation (yes/no + specific words used about money), since we noticed that multiple apps had personas and/or mentioned subscriptions or paid packages. After the first round of thematic coding, which the whole team conducted together in different sections, we discussed our initial findings to settle on specific categories of apps based on their functions. By agreeing on specific categories, we could ensure coherence in the dataset analysis, even if the coding was divided between individuals.

After categorising the apps according to their features, we visualised our data with different tools in Excel, Wordcloud, and RAWGraph, and analysed our results. RAWGraph is an especially useful visualisation tool for research in the humanities since it requires minimal technical knowledge and can provide multiple different models depending on the data used (Mauri et al., 2017).

ChatGPT Store

For the GPT Store, we could not scrape data with the existing App Studies Capture & Analysis Toolkit, as no module exists yet, so we manually copied and pasted the names of the apps, the app developers, the app capabilities, and the descriptions into our data sheet, taking the first 15 results for all six queries, resulting in a dataset of 90 apps total. Here we also coded the verbs used in the description, but overall focused more on the types of personas in the dataset, since personas offer a useful framework to study how large language models are tailored for a particular purpose (Tseng et al., 2024). We therefore extracted all the names of the personas from the different queries to understand the types of personas available.

Analysis and Findings

Our research across three major app stores revealed a notable presence of AI-driven religious applications. However, the extent of AI implementation and the way it was presented varied significantly across platforms, apps, and religious traditions. Each app ecosystem exhibited distinct patterns in how AI was employed, marketed, and integrated into religious digital spaces.

The App Store Landscape for AI and Religion

We identified 55 apps that lacked religious content but still appeared in religion-related search queries (Figure 3.2). This finding suggests that search algorithms in app stores may not effectively distinguish between religious and non-religious AI applications, possibly due to keyword overlap or algorithmic biases. We encountered multiple apps that used religious terms in some of the developer details, which could explain the appearance of the app in the specific queries. Some notable examples include apps like *Neverending: AI, Gauth: AI Study Companion, or Wingman Rizz*, which, despite being listed under religious search terms, primarily focus on the artificial intelligence trends in the app stores. This raises the question of how AI-related keywords are being leveraged by developers to reach wider audiences beyond strictly religious applications.

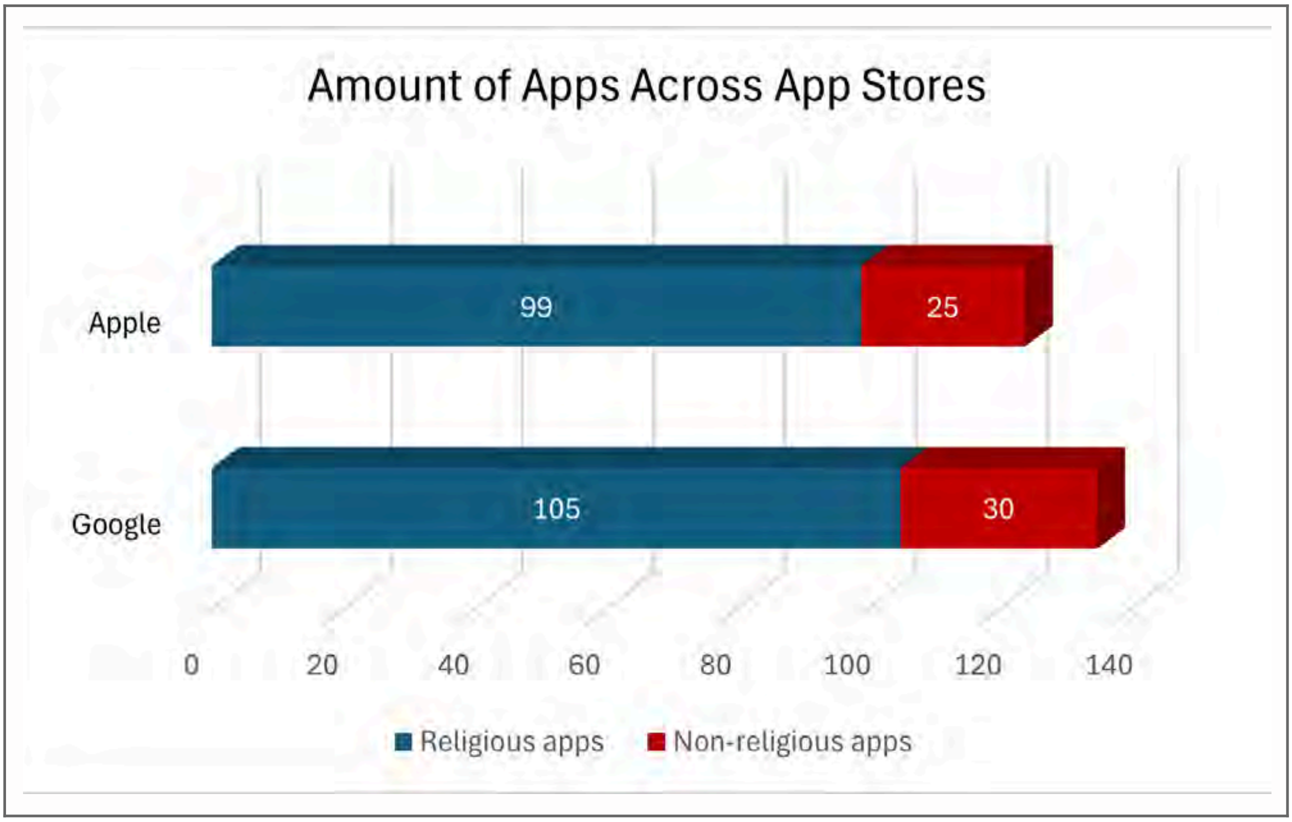

Figure 3.2. The religious and non-religious divide exists across both app stores.

A key observation in our analysis was the prevalence of 'AI' as a branding tool in app stores. Many apps prominently included 'AI' in their titles, such as Quran Chat: AI Islam Assistant, Imom AI, and Christian AI, positioning themselves as AI-driven apps, regardless of the actual depth of AI integration. Despite our AI-centred search queries, a substantial number of apps in the dataset appeared to be AI-free. Examples of such apps include Muslim Pray Times &

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Qibla Finder, Ramadan Times 2025 Athan & USA, and UIII TripleAIYou, which were returned in AI-related searches despite lacking clear AI-driven features. Conversely, some apps incorporated advanced AI-driven chatbots and machine-learning functionalities without explicitly mentioning AI in their descriptions, like the Jesus Chat app:

> 'Jesus Chat is an interactive mobile application that facilitates your personal conversations with a simulated representation of Jesus Christ, drawing from the Bible, Christian theology, and centuries of spiritual wisdom. We've designed Jesus Chat to provide guidance, help you pray, and support you through life's joys and trials.' (Hyperdrive Technologies, 05-06-2023)

Notable differences emerged across the three app stores. The Apple Store generally provided more relevant results featuring apps that actively utilised AI. In contrast, Google Play had a significant number of apps labelled as AI-driven but lacking actual AI functionalities. The ChatGPT Store, designed specifically for AI-driven applications, presented a niche but rapidly growing selection of AI-enhanced religious tools. The disparities between these platforms suggest that different store policies, algorithms, or user behaviours influence the presence and promotion of AI-integrated religious applications.

When conducting a neutral search using the term 'AI religion,' most results skewed toward Christianity-related applications. This could indicate a stronger market presence of AI-driven Christian apps compared to other religious traditions, or it may reflect biases in search algorithms and app development trends, or a geographical bias to the US store.

A linguistic analysis of app descriptions, supported by cloud graphs, revealed common verbs and action-oriented phrasing (Figure 3.3). The Apple Store apps emphasised personalisation and transformation, using verbs like immerse, educate, inspire, deepen, and revolutionise. Similarly, ChatGPT-powered apps emphasised guidance and knowledge-sharing, with verbs such as connect, discover, search, share, and understand. Google Play apps, meanwhile, offered a mix of mediated engagement and action within religious practice, with verbs like chant, meditate, embark, generate, pray, and translate, reinforcing the individualised journey offered to users.

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Figure 3.3. Word clouds based on the descriptions of the apps.

Monetisation played a crucial role in the AI-religion app ecosystem. Many apps relied on subscription-based models, in-app purchases, or ad-supported structures. While some offered limited access for free, full functionality, especially in apps featuring AI-driven spiritual guidance, was often locked behind a paywall. A striking example is the AI Pastor: Christian Chat, Talk app, which advertises ease of access and constant availability through its tagline: 'AI Pastor is your trusted friend and guide, always by your side to help you find answers, support, and inspiration on your faith journey' (Savelii Veprev, 11-08-2024), but requires a fee for unlimited chatting with the pastor or repeated AI-mediated confessions. This business model, which capitalises on the promise of on-demand spiritual support, raises ethical concerns about the commodification of religious experiences and the extent to which these services remain accessible. The tension between inclusivity and monetisation becomes especially pronounced when essential or heavily marketed features are reserved for paying users.

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Additionally, the representation of different religious traditions varied, with some faiths enjoying a stronger presence in AI-integrated applications than others (Figure 3.4). Christianity and Islam are dominating the app landscape, which complicates the question of equitable access. This disparity prompts further inquiry into whether AI in religious apps is shaping broader spiritual inclusivity or simply reinforcing existing digital and economic divides.

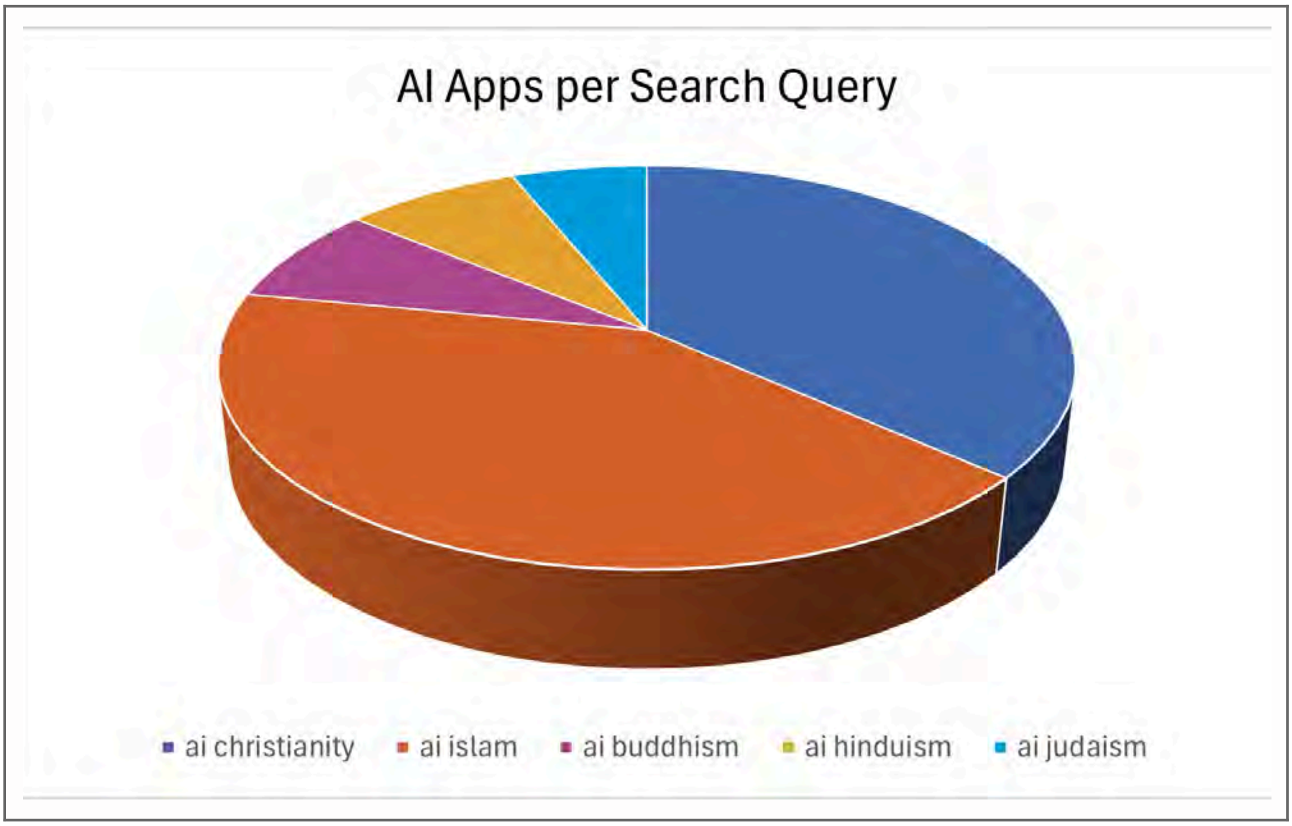

Figure 3.4. The AI divides between the different faiths in our dataset.

The integration of AI into religious apps is reshaping digital faith practices, but the landscape is marked by inconsistencies in AI implementation, commercial motivations, and religious representation. As AI continues to develop, further scrutiny is required to assess its role in fostering inclusive and meaningful spiritual engagement across diverse religious traditions.

AI Features and Personas in Religious Apps

When inspecting the features and functions of each AI religion app within the dataset, there were noticeable trends. We constructed categories based on these functionality overlaps, allowing for an analysis on what types of functions were observed within these AI religion

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apps, how many of each, and what this says about the apps within the dataset (Figures 3.5 and 3.6). Our developed categories can be found below:

- *Chatbot:* includes a chat box function with AI (either personified or not).
- *Social Platform:* This includes a space where creations can be shared with different app users.
- *Non-AI:* apps that did not mention AI in their description or their photos in the app store, but did still relate to religion in some sort of way.
- *Interactive Scripture:* religious scriptures that are made interactive through, for example, search functions, videos, generative art, etc.
- *Personalised Guidance:* includes functions focused on the user's specific wants and needs, e.g., personalised daily quotes from the bible or personalised meditation schedules
- *Games:* religious games or quizzes.
- *Multimedia Art*: includes multimedia functions such as generating art based on the bible.
- *Spiritual Practices:* specifically non-religious spiritual practices, such as astrology apps.
- *Education:* specifically masterclasses/ courses, etc., more than general teachings about the bible.

Moreover, the majority of generative AI features integrated into religious apps emerged in the form of automated chatbots, personalised guidance, and interactive scriptures. Personalised guidance included generation of journaling prompts, prayers, guided meditations, or verse imagery. Interactive scripture emphasised the ability to individually explore and interact with ancient religious texts, such as elaborating on the meanings and interpretations of specific passages. These features also overlapped with the broader usage of chatbots, where the user can directly converse with artificial intelligence about religious subjects. Generally, there was more text-based free content generation than visual content.

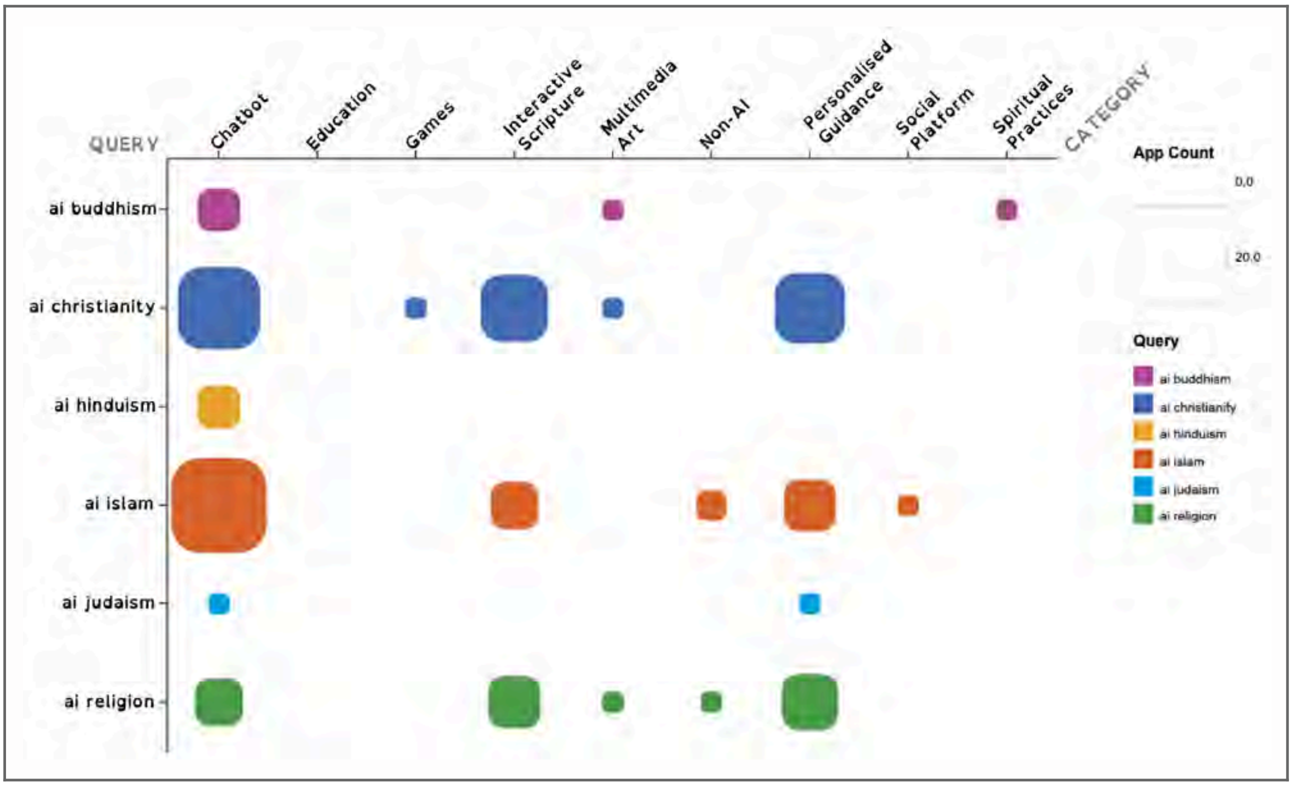

Figure 3.5. App features & functions per query in the Apple App Store.

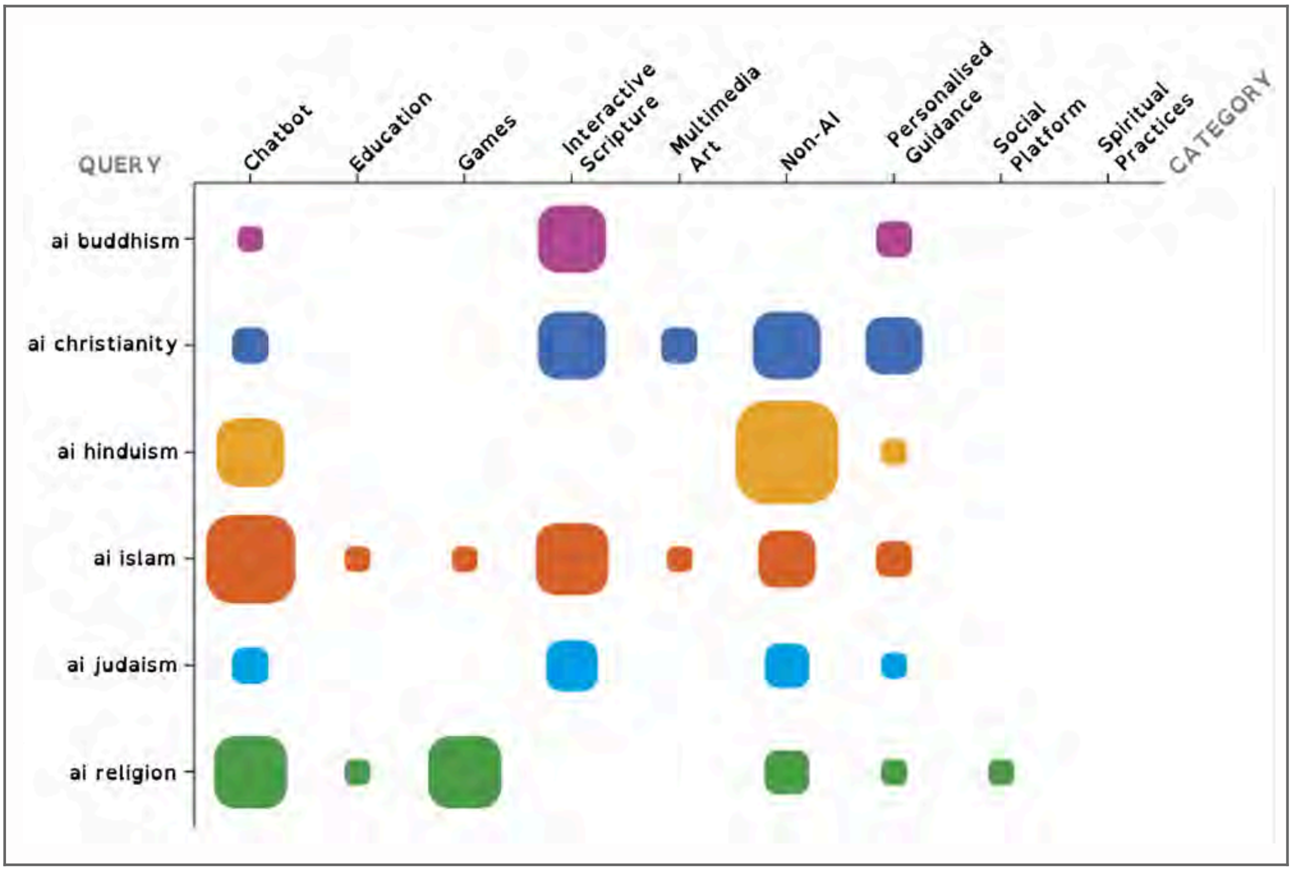

Figure 3.6. App features and functions per query in the Google Play Store.

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How these religious apps presented the usage of their AI was often personified, whether it be through the adjectives used to describe the AI within the app's description or the explicitly-named identification assigned to its chatbot. The words or names used to personify the AI across the dataset were recorded for comparison (Figure 3.7). Many of the apps were found to use religious figures in the format of a higher religious authority. These personas included God, Jesus, Buddha, and a variety of Hindu deities. Similarly, there were those personified as religious leaders, such as AI Rabbi, Priest, or Imam, who can be conferred with. Some identities were fictitious, but still considered individuals with religious chatbots named 'Grace' or 'Faith.' Meanwhile, others made use of a more 'neutral' entity and were referred to as a religious expert, tutor, or companion, among others. These neutral personifications had the most reach across different religious groups. Expert, for instance, was present for all five.

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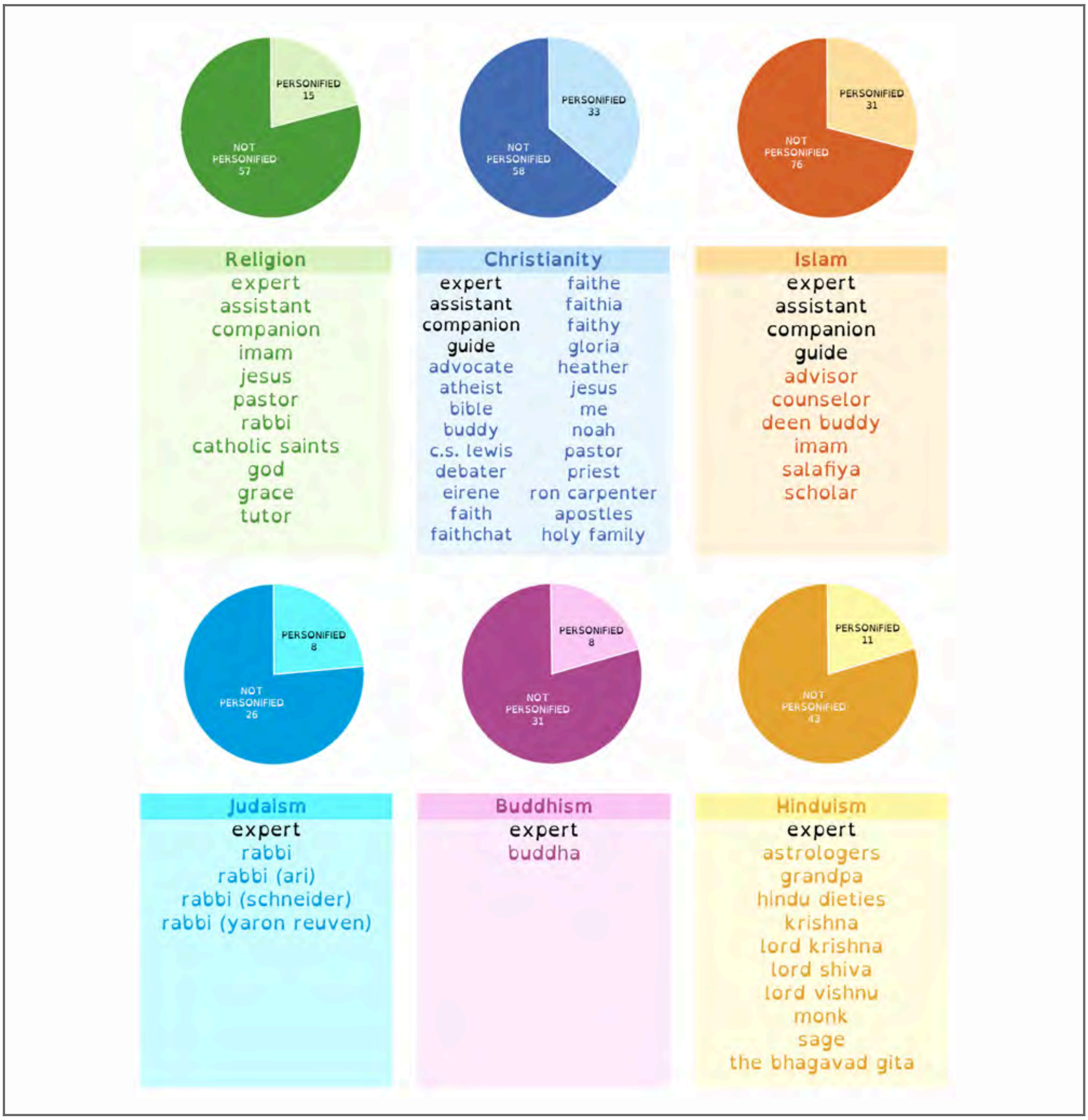

Figure 3.7. AI Personas across the database per search query, and how many apps per query personified AI. For the specific religions, colored names are unique to one religious tradition; black names appear across multiple. Names in the 'Religion' query are not specified because they are generalised by default and instead function to demonstrate what appears in a generalised search.

Discussion

Apps, as Fagerjord (2015) and Morris and Murray (2018) argue, are not neutral delivery systems but nodes within larger networked infrastructures that mediate and form culture. Religious apps, particularly those employing AI, are no exception. They exemplify the logic of

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'appification' (Dieter et al., 2019; Goggin, 2021), through which mobile interfaces integrate into daily life, producing new social realities and user dependencies. Our findings show that this process is intensified through AI, as religious content becomes not only more accessible but also interactive, personalised, and potentially commodified, complementary to what Cheong (2014) refers to as Religion 2.0.

Building on Campbell et al.'s (2014) framework of categorising app functions found through Apple's App Store, our study adds to this typology by identifying new categories of AI-driven religious practices, including agent-like chat features, AI personas, and algorithmic spiritual guidance. These practices show how AI is enabling new forms of engagement that are more interactive, emotionally responsive, and curated than earlier religious apps. In particular, this shows what Van der Vlist (2025) calls 'the appification of AI', referring to the shift of artificial intelligence from hidden backend infrastructure to visible, user-facing features designed for enhanced interaction and personalisation. In our study's case, this transformation is not merely technical, but also spiritual, as AI does not just support the religious interface, but it becomes the interface. It mediates what is said, when, and how, through chatbots and AI personas that reconfigure traditional religious authority and ritual into algorithmically determined interactions.

By documenting these features, our study contributes to the understanding of how digital religion is evolving in the age of generative AI. The AI-based functionalities we identified, such as scripted spiritual conversations with chatbots, predictive prayer recommendations, or the profiling of users, introduce a new palette of religious practices that move beyond what prior typologies have captured. This contributes not only to the literature on religious apps but also to broader debates in app studies on how appification and now AI-fication shape user behaviour and embed commercial logics within daily life (Dieter et al., 2019; Goggin, 2021; Morris and Murray, 2018). As of now, it seems that these apps are not passive tools, but active platforms that experiment with how spiritual authority and religious meaning are produced, personalised, and packaged for mobile consumption.

For instance, the use of AI-powered religious personas, meaning the apps that allow one to 'chat with Jesus' or receive advice from saintly figures, extends traditional devotional practices with conversational, always available, AI-driven formats, offering users a sense of mediated presence and intimacy. Furthermore, this aspect also contributes to the shift from a collective to an individual experience. As claimed by Rinker et al. (2016), digital religious tools contribute to the individualisation of religious experience, encouraging users to engage with spirituality in everyday, personalised ways rather than through traditional institutional structures. This aspect was also proven in our study through the use of verbs found in the app descriptions

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(e.g., guide, focus, search, personalise), prioritising this narrative of a self-driven and action-based curated journey.

Yet, it is important to note that the user does not possess full agency over what constitutes this interactive experience, as it is the platform's logic that frames their religious experience (Helland, 2016). For example, the religious chatbots frame engagement through curated personas, restricted response formats, and behavioural nudges such as daily prayer suggestions. These features appear personal, but are driven by intentional design decisions that are often opaque to users. Additionally, this lack of transparency begins even before users download an app. As our analysis shows, many apps unrelated to religion still surfaced in religion-themed search queries. This suggests that app store algorithms may mislead users by prioritising developer-inserted keywords over actual content, reflecting broader problems of discoverability and algorithmic bias. These opaque processes raise critical concerns about how spiritual practices are mediated, and not just within apps, but by the infrastructures that direct users to them in the first place.

In this way, our study shows how AI religious apps also contribute to what Goggin (2021) calls the 'social laboratory' of app-based experimentation. In this study, spiritual interactions are not only shaped by AI logic and platform architecture but also commodified through visibility algorithms and keyword manipulation, turning religious search and engagement into an experimental space structured by commercial motivations.

Finally, our findings show that the growing presence of AI is reshaping both the app landscape and religious practice. On one hand, apps labelled as 'AI' without clear AI functionality reveal how AI is used as a marketing tool, contributing to the appification of AI across platforms. On the other hand, in genuinely AI-driven religious apps, we see how religious habits and practices are being redefined, becoming more personalised, interactive, and shaped by the design and logic of the platforms themselves.

Conclusion

In conclusion, by focusing mainly on the app descriptions of over 300 apps across three US app stores, our research offers an overview of the current religious AI app landscape. Our main findings regarding the functions of the religious apps show that AI adds a sense of individual personalisation and immersive interactivity. The most prominent functions of AI in the apps were the personalisation, interactivity, and chatbots, implying a modernised way of interacting with deities and practising religion. This was also evident in the prevalence of AI personas, recurring for all religions and acting as deities, religious leaders, or general experts

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and fictive companions. This personalisation makes spiritual practices more inviting and accessible to adults who have high religious commitment or younger users more prone to engage with AI, but also corresponds to a trend of apps making spirituality more individualised rather than community-based.

Furthermore, the term ‘AI’ is often used inconsistently across app listings, with many apps either lacking actual AI functionality or using the label primarily for marketing purposes. This can be viewed as a consequence of the AI-fication of app stores, where AI is not only a backend technology but also a discursive and commercial category shaping how apps are labelled, discovered, and consumed. For religious apps in particular, the presence of algorithmic design, commercial interest, and spiritual content means that religious engagement is increasingly shaped by platform logics and app store dynamics.

Moreover, the dominance of Christianity and Islam within AI religious apps and the presence of monetisation features further illustrate how religious practice is being shaped by both technological and economic systems. This supports broader insights from app studies, as apps are not neutral tools but are embedded in infrastructural, commercial, and cultural frameworks that influence user behaviour and meaning-making.

Future studies could examine app interfaces more closely, investigating how different features are designed and how certain functionalities, especially AI-driven interactions or personalised content, operate and are monetised. Additionally, it would be valuable to look into the long-term effects of AI on religious practices by interviewing users on their own experiences of using such apps. Finally, exploring the developers behind these apps could provide a better understanding of the motivations and design choices influencing AI integration into religious platforms.

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4 Education

AI and the Appification of Education

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Başak Raşa · Jin Zou[10]

Abstract

This chapter examines the integration of artificial intelligence (AI) into educational apps, focusing on how appification—the embedding of apps into social, cultural, and infrastructural contexts—reshapes digital education. AI-driven educational apps increasingly prioritise personalisation and adaptive learning, influencing pedagogy and learner experience. Yet, there are notable gaps in understanding how systematically and unevenly AI functionalities are adopted across educational domains. We ask: *Is AI being integrated into educational apps, and in what ways?* Using digital methods for app studies (ASI/DMI 4CAT App Studies Capture & Analysis Toolkit, app store analysis, and ChatGPT-based categorisation), we analyse app descriptions to map AI features across sectors. Findings point to the dominance of adaptive learning, sectoral disparities, and ethical concerns around data use and pedagogical impacts, underscoring the need for more transparent and responsible AI integration in education.

Keywords: appification · educational apps · artificial intelligence (AI) · personalised learning · app stores · digital education · educational technology

[10] *Grey:* Co-authors of the initial report, but not of the revised published version.

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Key Points and Findings

- AI functionalities for personalisation and adaptive learning dominate the educational app landscape, reflecting market-driven prioritisation.
- AI integration is uneven, with certain sectors (e.g., professional education) underrepresented, raising questions about future development.

Introduction

Apps are perceived as a catalyst in contemporary computational culture, deeply influencing social structures and digital spaces. Gerlitz et al. (2019) argue that apps have become socio-technically embedded in society, and go beyond a simplified technical integration into society, but interfere deeply in a non-technical manner, shaping cultural, social, and political norms. The socio-technical embeddedness of apps and digital infrastructures in combination with the traditional notion of education as a social engine for shaping society raises the question of what the appification of education implies for contemporary computational cultures.

According to Gerlitz et al. (2019), contemporary computational culture is defined by the presence and embeddedness of apps within social, cultural, economic, and technical infrastructures. It points towards a culture in which, for instance, mobile apps have become central in infrastructural systems and social structures and shape societal activity, institutions, and power dynamics. In this context, the authors speak about App-Infrastructure Stack, implying how these computational cultural infrastructures are composed of different layers, explaining how they influence and interact with society as a whole.

Traditionally, education has been one of the main engines in contemporary societies, shaping and influencing the public. Education has been an instrument for the government to educate citizens and increase collective human capital. Nevertheless, it has also been used as a tool for indoctrination. A recent example illustrating this tension is the legal case in which Harvard sued the U.S. government, alleging violations of freedom of speech and academic freedom, where the emancipatory and indoctrinatory potentials of education come into direct conflict (Powell, 2025; Mascarenhas, 2025).

In the same way that digital spaces change and pave the way for apps to embed into digital infrastructures, digital education is becoming more prominent and standardized. The number

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of online universities is increasing, combined with the rise of Massive Open Online Courses (MOOCs) such as Coursera and edX. Both MOOCs were the biggest in 2025, totalling 250 million users, while the educational content is primarily being dominated by US universities (Coursera, 2023; edX, 2018).

Similarly, education is increasingly 'appified', with the rise of apps like DuoLingo, but also Gauge as a homework assistant. Subsequently, digital education opens pathways for the integration of Artificial Intelligence (AI) into education. The famous open-source tutoring school Khan Academy has developed a new feature called Khanmigo, integrating Intelligent Tutoring Systems (ITS) into learning. For example, the AI chatbot never gives the full answer but only nudges the student in the right direction.

The application of technologies such as ITS is a signal from the market indicating the integration of AI in the appification of education. The integration of AI in the appification of education is particularly interesting considering the layered computational culture of Gerlitz et al. (2019). Thus, the research question of the research report is: *Is AI being integrated into educational apps, and if so, in what ways?*.

The broader context in which this research is conducted relates to the app ecosystem, in which the appification of culture and social norms is becoming more prominent, as well as the rise of 'datafication' through apps (Van der Vlist et al.). Datafication is especially important in societal faculties such as education that shape and influence societies. The collection of data from learners will influence the functioning of AI in educational apps, but also vice versa, demanding epistemic scrutiny of the development of the educational app-ecosystem.

Literature Review

'Appification' has been defined as the process by which aspects of daily life are increasingly being integrated into mobile applications, fundamentally altering how we carry out those activities (Goggin, 2021; Morris and Murray, 2018). Morris and Murray set a foundation for app studies by asserting that no activity is too trivial to be 'appified.' They note how apps have extended software's reach into leisure, commercial, educational, interpersonal, and other spheres of everyday activity (Morris and Murray, 2018). By treating apps as serious objects of study rather than throwaway gadgets, scholars have uncovered the cultural significance of apps' 'mundane software' (Morris and Murray, 2018). For example, a simple educational app for flashcards integrates design decisions and user experiences that speak to broader paradigms of self-improvement and efficiency. Lupton (2020) likewise emphasises that apps are imbued with societal values and expectations; apps designed for learning or health often carry assumptions about ideal users (e.g., self-motivated, data-driven learners) and thus deserve critical examination rather than uncritical celebration.

Similarly, Goggin (2021) explains how applications have become part of the educational infrastructure, stating that 'apps are a key part of the digital layer now governing everyday educational access, particularly where public services are being replaced by platforms' (p. 12). This digital layer, combined with the reinforcement of cultural norms through apps, subjects the appification of education to neoliberal influences. For example, Coursera is a rapidly growing educational platform with a global reach, yet it is dominated by top-tier universities from the Global North. In this regard, the digital platforms used for education are subtly exposed to cultural frameworks that shape expectations, behaviours, and power relations. This indicates that digital tools in education, especially when AI is integrated into appified education, are not immune to the skewed distribution of cultural factors within global educational institutions.

Trifonas (2017) approaches this critique from a political and philosophical standpoint, describing digital technology in education as a pharmakon—a substance that is both a cure and a poison. In the age of digital globalisation, he argues, the same tools that promise educational democratisation can also reinforce existing inequalities, as learning becomes commodified (p. 151). This duality is part of a broader debate on education as a 'techno-epistemological environment,' where knowledge risks being redefined through the logic of the market, increasingly legitimised by its value as commodified information (p. 159). Trifonas warns that 'the demands of corporate agendas advocating the necessary technological competence of a new careerism have transformed educational goals' (p. 150), signalling a shift from critical, humanistic purposes toward instrumental and efficiency-oriented ends. These dynamics reflect the cultural, economic, and ideological complexities of digital education, urging a critical examination of whose interests are being served—and how through appified education and the integration of AI.

Over the past decade, AI has evolved from experimental tools into powerful systems increasingly integrated into personalised learning platforms, intelligent tutoring systems (ITS), chatbots, and automated assessment frameworks. This ongoing transformation is reflected not only in the academic discourse's growing focus on the technological affordances of AI but also in its pedagogical, ethical, and contextual dimensions. AI's capacity to analyse vast amounts of data—crucial for personalised learning—highlights its potential advantages, such as addressing inequalities through large-scale substitutes for Shadow Education (SE), increasing access to education, or combating disengagement in classrooms. However, the

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literature also points toward disadvantages, attempting to weigh the pros and cons of AI integration in education.

Gillani et al. (2023) categorise AI into computational paradigms such as supervised learning, unsupervised learning, reinforcement learning, and rule-based systems. These differ in their data processing and decision-making, thus influencing educational environments in distinct ways. For instance, supervised learning trains algorithms to predict outcomes, such as students' GPAs, based on historical data like attendance, performance, and demographics. In contrast, reinforcement learning models decisions through trial-and-error interactions, making it well-suited for adaptive tutoring systems that adjust instruction based on student responses. While these models show promise for personalising learning and improving outcomes, Gillani et al. (2023) caution that many of them function as 'black boxes,' making it difficult or impossible to understand how decisions are made. This opacity raises concerns around transparency, accountability, and trust. These issues are particularly critical in education, an inherently epistemic system without interpretability and oversight, as AI risks undermining core educational principles such as fairness, agency, and pedagogy, especially when personalised learning systems are powered by opaque decision-making models.

Nonetheless, real-world applications of AI in educational apps are emerging. Harry and Sayudin (2023) examine examples such as personalised learning tools like Duolingo and institutional chatbot systems like Georgia State University's 'Pounce.' These tools demonstrate how AI can enhance learner engagement, automate administrative support, and reduce educators' workload. For example, AI-enabled chatbots provide timely information for tasks like course registration, supporting students in navigating complex academic systems. Duolingo uses learner data to adjust instructional pace and content in real time. However, Harry and Sayudin (2023) note that such personalisation is not inherently equitable. The fairness of AI recommendations depends heavily on the quality of training data and algorithmic design. Biased or incomplete inputs can lead to outputs that reinforce, rather than rectify, existing educational disparities.

Structural limitations also persist. AI systems often fail to capture the nuance and complexity of human learning. For example, while automated grading may be effective for grammar or syntax, it struggles to assess creativity, argumentation, or rhetorical skill. This limitation may encourage students to submit standardised, low-risk responses, thereby narrowing the scope of what is considered valuable in learning (Gillani et al., 2023). Moreover, overreliance on algorithmic feedback can erode the human relationships that are foundational to effective teaching. As Harry and Sayudin (2023) caution, chatbots and automated systems may increase efficiency, but they should augment, not replace, human interactions. These real-world cases illustrate how even well-intentioned AI applications can unintentionally perpetuate systemic inequality, echoing the theoretical and ethical concerns previously discussed.

While AI promises to enhance learning outcomes, its adoption must be critically examined through cultural, political, philosophical, and pedagogical lenses. Academic discourse makes it evident that these technologies are never neutral—they reflect, reinforce, and potentially augment broader systemic structures. To ensure equitable and effective implementation, AI tools must be designed with transparency, teacher participation, and social accountability. Ethical educational innovation demands not just technical advancement but also a conscious commitment to inclusivity and justice. Without this, AI may entrench existing inequalities rather than resolve them.

Data and Methods

Dieter et al. (2019) situate App Studies methodologies in the context of their infrastructural embeddedness. One of the main entry points for conducting App Studies is App Stores, such as the App Store or Google Play. App store technological infrastructure is subject to affordances, built-in logics, and mechanisms, but more specifically, personalised (Google Play) or topic-based (Apple Store) algorithms (Dieter et al., 2019).

App stores are best suited for investigating the integration of AI in the appification of education, as they allow you to analyse the indices of apps, such as publication year, ratings, and description of the app. The description of the app in App Stores is crucial for analysing the integration of AI, as no special indices regarding the use of AI are integrated in App Stores.

Additionally, analysis of app stores allows thematic exploration of ecosystems by observing the distinction between ‘for that’, ‘for’, and ‘in-app’. For example, an app like DuoLingo is a ‘for that’ app as it seeks to resolve the societal issue of learning a new language, in contrast to a ‘for’ app which is developed for a platform or an ‘in-app’ which is developed as a part of an superapp (Van der Vlist et al.). This analysis will focus foremostly on the ‘for that’ ecosystem of educational apps, to understand the integration of AI in resolving education-related societal issues.

The objective of the study is to collect the functionalities of AI in educational apps and categorise them into educational sub-sectors by inquiring into the description of apps in App Stores and the official websites. To begin, educational applications were categorised based on their institutional affiliation, distinguishing between institutional (e.g., university-affiliated) and non-institutional (e.g., private or commercial) apps. Prima facie analysis revealed limited

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access to institutional apps, along with a potentially lower number of institutional educational apps. Thus, the focus of this essay will be on non-institutional apps.

To understand the economic and cultural dynamics of AI integration in educational apps, this study focuses on sub-sectors in education and the different types of AI functionalities employed within apps. Distinct AI functionalities persist in the integration of AI in education, justifying this form of categorisation. Similarly, the hypothesis is that different sub-sectors of education require different functionalities and integrate distinct aspects of AI. Accordingly, AI functionalities and educational sub-sectors will serve as the primary cross-variables analysed.

Subsequently, a query design was formulated to capture as many educational apps integrating AI as possible. Two search queries were constructed. First, a more focused query—'Education, AI'—was used to generate an efficient overview, resulting in 100 items. Additionally, a comprehensive query was formulated using: 'education, learning, studying, teaching, training, tutoring, classroom, student, teacher, curriculum, lesson, course, AI, artificial intelligence, tutoring, coach, mentor, assistant, study guide, adaptive learning, personalised learning, intelligent tutoring system, automated feedback, automatic grading, assessment, quizzes, flashcards, homework help, edtech, gamified learning, digital classroom, mobile learning, online learning, remote learning, MOOC,' which yielded 1,592 items. Both query outputs were manually filtered to select only those educational apps that integrated AI (or were AI-related in an educational context), resulting in 28 educational apps that have integrated AI.

Data collection was conducted using the App Studies Capture & Analysis Toolkit, followed by manual verification of app entries via the Apple App Store to ensure accuracy and completeness. The collected data was exported and formatted into a CSV file, with structured columns including, but not limited to: app name, developer, pricing, release date, app store description, similar apps, and other metadata.

The core of the analysis centres on identifying AI-related functionalities, as mentioned in the app descriptions. To systematise this process, OpenAI's ChatGPT was employed. A standardised prompt was developed, instructing ChatGPT to: (1) Consider the research aim; (2) Analyze the description of the application; and (3) Output the detected functionalities in a structured format: (a) Functionality, (b) Description/explanation, and (c) Suggested CSV label.

To ensure accuracy and validity, each output was manually verified by comparing the functionalities identified by ChatGPT with the original app descriptions. In a second layer of analysis, where available, the official website of each app was identified, and its URL was input into ChatGPT with a prompt to scrape content and extract any additional AI functionalities.

Some apps lacked functional descriptions in the app store but marketed their AI features on their official websites. In certain cases, such as with Duolingo, AI integration was not immediately visible on the website through manual browsing. However, ChatGPT's web search functionality revealed 'hidden' links showcasing AI integration. Again, these findings were manually reviewed to validate their accuracy and relevance.

Limitations

The subsequent step was to fine-tune the suggested CSV labels from ChatGPT, resulting in a standardised 'clean' label. The findings yielded 168 functionalities, most of which were closely related or overlapping. These 168 functionalities were clustered into eight categories. Additionally, all relevant apps were categorised into educational domains, referred to as 'Educational Focus Areas.' The objective of this categorisation is to observe which educational fields are integrating AI most actively.

The decision to use ChatGPT as a data-analytical tool originates from the restricted time span of this research. Collecting and categorising the functionalities of 28 apps is time-consuming, as ChatGPT found 168 different AI functionalities for the 28 apps (i.e., each app has multiple AI functionalities and demands careful observation for categorisations). Nevertheless, a rigorous manual verification is conducted to ensure ChatGPT did not make any mistakes, allowing this research to save time without being subject to computer biases.

Analysis and Findings

Limited Number of Dedicated AI Education Apps in the App Marketplace

From an initial sample of 100 apps collected in the Apple App Store, only 28 were formally categorised in the platform's 'Education' category (Figure 4.1). This significant reduction suggests that there is a significant difference between apps that include educational features and those that are formally recognised as educational by the platform's categorisation system. While many apps use AI for learning-related purposes (e.g., tutoring, summarisation, or skills development), they are often categorised in other areas such as productivity, lifestyle, or utilities.

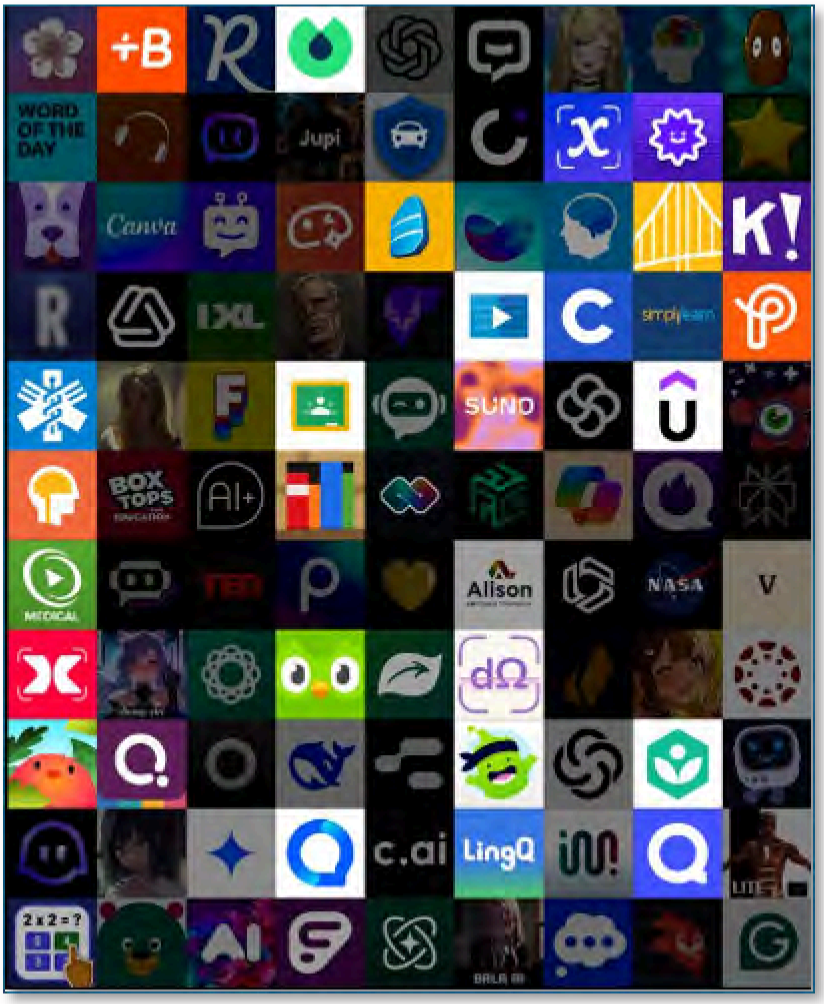

Figure 4.1. An overview of educational app search results, with relevant AI-related educational apps used in this research, is highlighted.

This finding suggests that many versatile AI apps contain embedded educational features, but the number of apps developed specifically for educational purposes remains limited. Rather than being purpose-built for classroom or curriculum-aligned use, these apps are often general-purpose tools that happen to support learning-related activities. Popular tools such as AI chatbots, writing assistants, or language models are often used by users for learning activities, even though they were not originally designed for structured educational environments. By deciding which apps are categorised as ‘Educational’, platforms indirectly influence which tools are available for educators and students to view and use. This not only affects market dynamics but also pushes the methodological boundaries of educational technology research, as applications with strong pedagogical potential may be systematically overlooked due to inconsistent categorisation.

This has several important implications. First, it reflects the blurring of boundaries between educational and non-educational technologies. The rising use of technologies not initially designed for pedagogical use in today's app ecosystem indicates a change in the way and location of educational engagement. Second, the way platforms classify apps has a subtle but significant impact on what consumers looking for educational resources may see and access.

Adaptive and Personalised Learning Dominates AI Educational Functions

Our feature analysis based on the app store's descriptions and further validated through official websites reveals a clear dominance of Adaptive and Personalised learning features in current AI education applications. As illustrated in the bar chart (Figure 4.2), this category stands out with 80 instances, far more than any other feature. The second and third most common clusters—AI for Learning and Tutoring and AI for Language and Communication—follow with 37 and 27 entries.

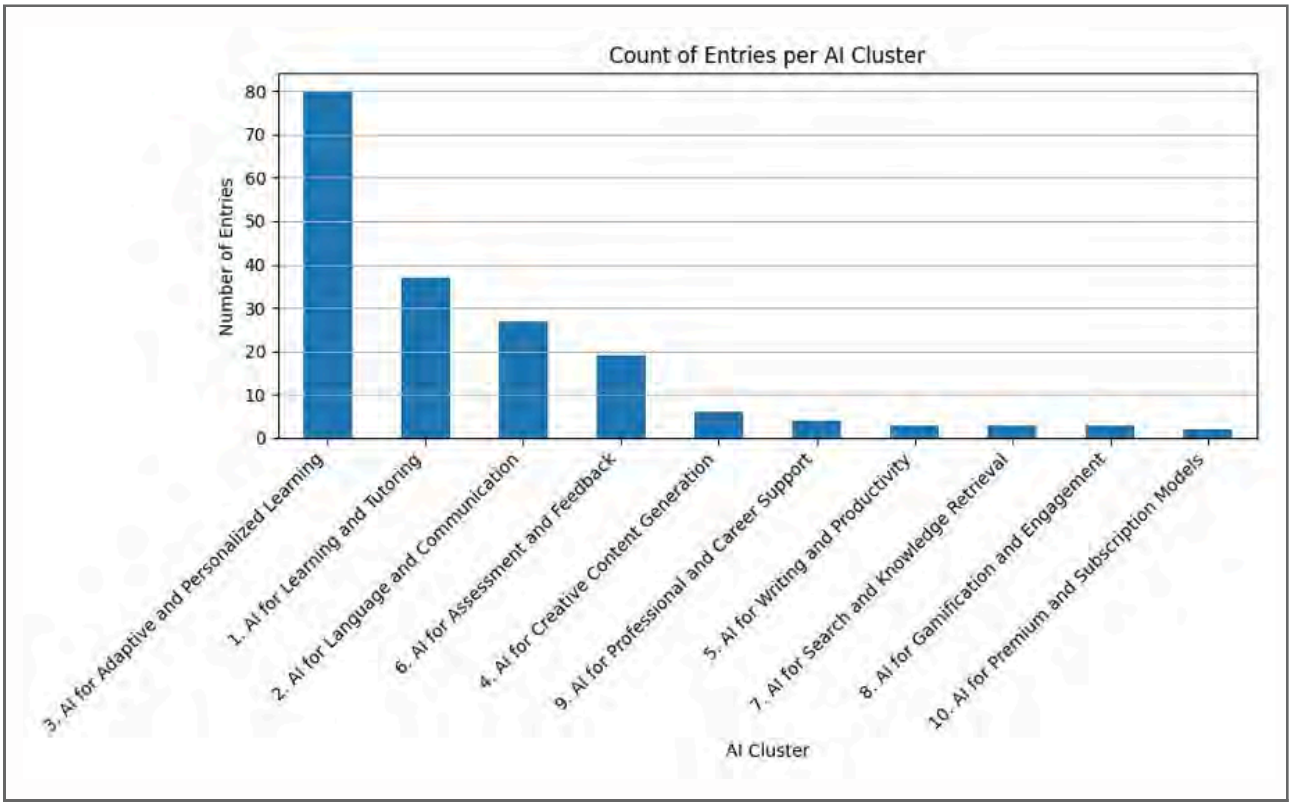

Figure 4.2. AI functionalities that appear most frequently in educational apps.

The prevalence of personalised learning features suggests that user-centred adaptive learning is currently the highest priority AI application for education. This is in line with broader edtech industry trends, where personalisation is seen as a key feature of AI,

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particularly in language learning, test preparation, and skill development applications. In contrast, features such as gamification AI, writing and productivity AI, and career support AI were less common, with each feature appearing in only a handful of applications. The heavy investment in personalisation suggests that developers and platform providers perceive this functionality as both highly valuable to users and commercially viable in competitive app markets.

These findings suggest that AI is primarily used to enhance individual learning pathways rather than to support collaborative, creative, or career-oriented educational outcomes. This lack of functional diversity raises important questions about the narrow conceptualisation of 'learning' in AI-powered educational technologies. While personalisation can bring valuable benefits, it can also limit opportunities for more holistic, socially engaged, or exploratory forms of learning that AI may support.

AI Functions Show Cross-Domain Versatility in Educational Applications

The Sankey diagrams (Figure 4.3) show that certain AI functions (notably 'AI for learning and tutoring' and 'AI for adaptive and personalised learning') have broad applicability across a wide range of educational domains. These functions are relevant to almost all categories of education, including learning assistance, academic education, vocational training, and early childhood education. Their wide reach underscores their foundational role in the modern educational AI landscape, enabling flexible and responsive learning experiences regardless of discipline or learner demographics. These AI capabilities serve as the foundation of educational technology, allowing for dynamic material delivery, real-time learning adaptation, and personalised learner assistance across a wide range of locations and age groups.

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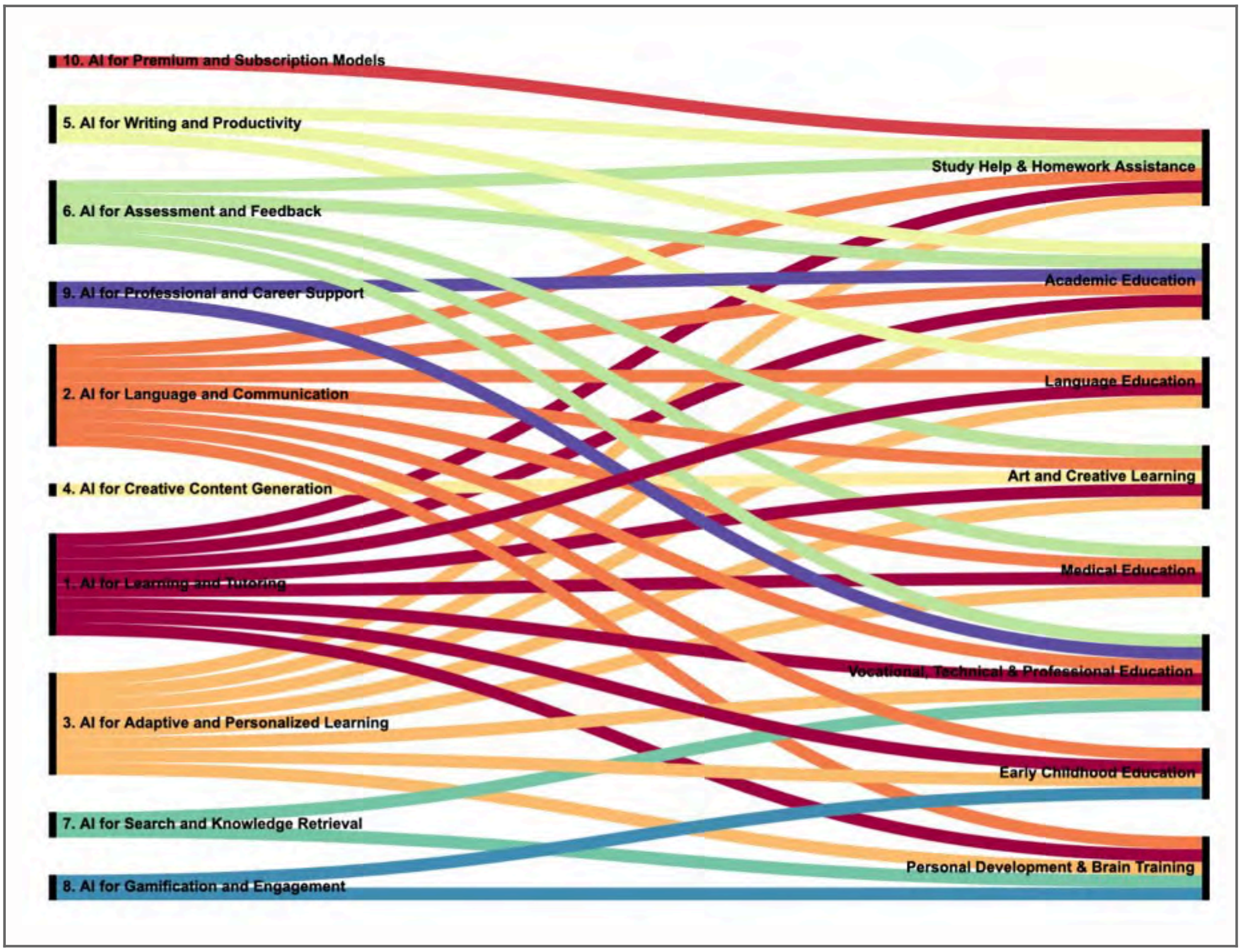

Figure 4.3. Categorisation of educational AI apps.

In contrast, more specialised features such as 'advanced and subscription-mode AI' and 'professional and career-supporting AI' exhibit limited domain connectivity, suggesting a narrower range of applications or less direct pedagogical relevance. The specialised nature of AI may mean it is not as easily embedded into standard instructional workflows, reducing its uptake in broader educational ecosystems.

This pattern suggests that the most integrated AI functions tend to support core instructional processes, such as content delivery, progress tracking, and learning adaptation. Their cross-divisional presence suggests technological convergence around functionality that enhances personalisation, engagement, and instructional effectiveness—a hallmark of modern AI-driven education platforms.

The diagrams demonstrate a stratification of AI functionalities, with some acting as universal enablers of modern education. In contrast, others remain specialised tools, contingent on context-specific demands or capacities. For example, gamification only occurred with the apps Hopster and Peakbrain, while Adaptive and Personalised Learning were integrated in almost all observed apps. This differentiation not only reflects current usage trends but also points to AI opportunities, particularly in expanding the reach and impact of underutilised AI features.

Uneven Distribution of AI Functionality Across Education Focus Areas

The matrix plots (Figure 4.4) highlight a notable disparity in the distribution of AI functionalities, showing that AI functionality is unevenly distributed across the different education focus areas, with a clear concentration of use in a few key areas. Instead, it tends to cluster around specific, high-impact applications. 'AI for adaptive and personalised learning' emerges as the most widely used functionality, particularly dominating the categories of vocational, technical, and professional education (100%), early childhood education (100%), and medical education (66.7%). The widespread adoption in these areas suggests a strong demand for AI systems that can tailor learning experiences to individual needs, preferences, or progress. This reflects a strong focus on customising learning experiences in professional or high-stakes educational environments.

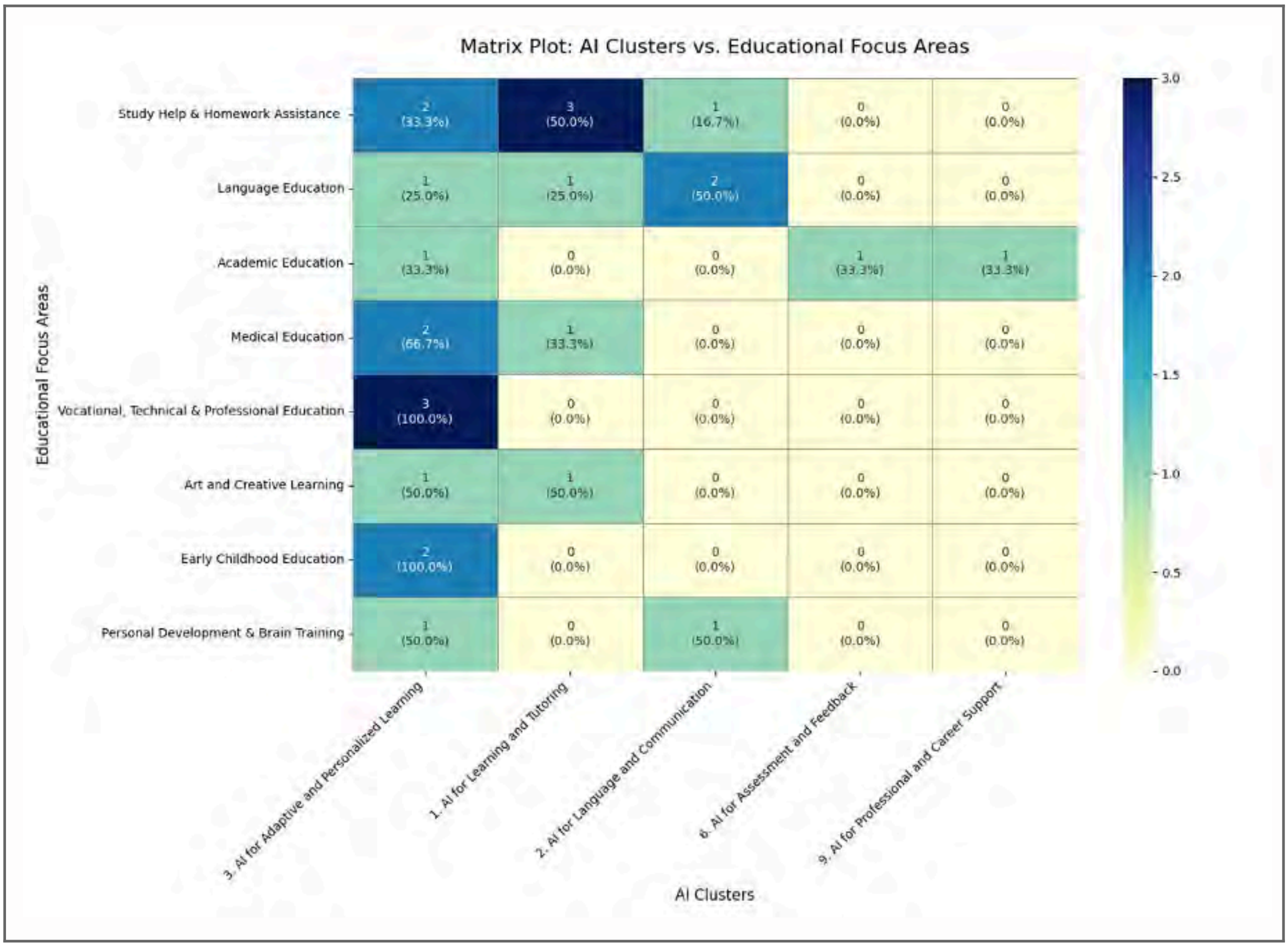

Figure 4.4. Relationships between educational categories and AI functionalities of AI apps.

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In contrast, the matrix chart also reveals a significant number of instances where certain AI functionalities are completely absent, suggesting that certain AI clusters (e.g., 'AI for Professional and Career Support' and 'AI for Assessment and Feedback') are still under-represented or missing altogether in most education categories. This pattern suggests several possible explanations: these functions may be less relevant or valuable in certain educational contexts, or there may be technical or pedagogical barriers to implementation.

The existence of these gaps suggests that while some AI applications are becoming mainstream in education, others have yet to find their place or prove their value. This suggests a wider trend towards targeted, needs-based adoption of AI, in which the integration of AI is driven more by the specific needs of each educational setting. The uneven uptake may also reflect differing stages of digital maturity across education systems or the prioritisation of certain outcomes.

The data suggests that some AI applications, particularly those that improve personalisation, are gaining traction and demonstrating their value. These findings highlight the need for additional study and innovation to better understand and overcome these gaps, ensuring that AI development responds not only to technology capabilities but also to the real-world needs of different educational communities.

Discussion

Situating the findings in broader debates, AI-integrated educational apps are both promising and require caution. The integration of AI into apps aligns with the trend of democratising access to personalised learning. A personal tutor is often expensive and a privileged artefact, while apps like Gauge offer similar guidance for a lower cost. This resonates with the optimistic view in app culture, where apps are seen as empowering tools, that is, the neoliberal idea of self-improvement through apps, as noted by Morris and Murray (2018). The integration of AI in the appification can enhance that narrative by making the learning experience more tailored, potentially improving outcomes.

However, there is a potential shift in pedagogical norms. If app-based AI tutors become commonplace and advance further, what is the role of human teachers and peer learning? The increasing level of micro-learning through apps combined with the integration of AI reshapes the educational landscape and how human beings learn, regardless of the adaptation of formal educational institutions to this trend. This is an example of how appification, per Morris and Murray, always has two sides—it offers new efficiencies and experiences, but also infiltrates domains with certain ideologies (e.g., the idea that learning should be constant, measurable, and optimised—an idea that underpins many learning apps).

The presence of AI in educational apps reinforces many existing trends in appification. By viewing AI integrations through the lens of appification, the study shows continuity with the past decade's transformations. Apps are further 'colonising' micro-learning, but also show a potential qualitative shift. Apps are becoming less like static tools and more like adaptive, semi-autonomous partners in learning. App studies as a field will need to continue bridging technical and cultural analysis to understand these phenomena fully.

Conclusion

This study demonstrates that AI is being integrated into educational apps in multiple and significant ways. Ranging from adaptive learning paths and AI-driven feedback to conversational tutors and algorithmic moderation, AI functionalities are augmenting the capabilities of educational apps, making them more personalised, interactive, and comprehensive. Findings show that certain AI functionalities, such as Adaptive and Personalised Learning, are widely implemented, making certain AI functionalities more prominent, while functionalities such as Gamification are not yet integrated as much. This highlights that not all AI functionalities are equally integrated in AI and educational apps, showcasing that certain functionalities are more common while others are niche.

Ultimately, the initial question—*Is AI being integrated into educational apps, and if so, in what ways?*—can be answered affirmatively: AI is not only being integrated, but is transforming the nature of educational app experiences. It is doing so by making apps more adaptive (shaping content to the individual), more responsive (providing on-demand solutions and conversations), and more embedded in wider infrastructures (linking app ecosystems with AI platforms). The study shows that AI is not integrated in one way, but consists of multiple and a variety of AI integrations, each with its own features and innovations.

Concluding, the convergence of app culture and AI technology marks a new chapter in appification—one that augments the role of apps as critical mediators of knowledge and micro-learning.

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5 Travel

From Travel Agent to App

AI and Appification in the Travel Sector

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Xuanyue Hu · Zhiying Li · Larissa van Wijlick

Abstract

This study investigates the emerging domain of AI-driven travel apps through app store analysis and walkthrough methodologies. Focusing on AI's functional implementations and discursive framing, we identify three key patterns: (1) Generative AI primarily supports pre-trip planning through itinerary generation and personalised recommendations, but offers limited functionality during actual travel; (2) anthropomorphic metaphors—such as 'companion' or 'expert'—are used strategically to build user trust while obscuring underlying commercial data practices; and (3) aspirational apps like *Romie* and *Mindtrip* consolidate travel services into 'all-in-one' platforms, leveraging AI-generated content and partnership programmes to expand their ecosystems. Our findings highlight a gap between the marketing promises of seamless AI assistance and the operational realities of these apps, situating these developments within broader appification trends in which artificial intelligence functions as both a service enhancer and a mechanism for data extraction.

Keywords: appification · AI travel apps · recommender systems · generative artificial intelligence (AI) · tourism

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Key Points and Findings

- AI primarily enhances pre-trip activities such as itinerary generation, personalised recommendations, and real-time adjustments, but remains limited during actual travel. Most apps rely on text generation and chatbots rather than more advanced functionalities.
- Aspirational apps, *Romie* and *Mindtrip,* consolidate services into niche 'all-in-one' apps. Through dynamic Magic Links, Rapid APIs, and B2B partnerships, these apps and their associated platforms establish complex ecosystems, positioning themselves as AI-enabled mediators and central nodes in the circulation of data and data audiences.
- Cultural narratives embedded in app design frame AI as a trustworthy companion or expert, effectively masking underlying data collection practices and commercial partnerships.
- These AI-driven apps prioritise monetisation through subscriptions, gamification, and partnerships, positioning users as both consumers and content producers. This reinforces platform capitalism, where user-generated itineraries and AI-generated data feed into closed ecosystems.
- AI recommendations may perpetuate biases and amplify popular destinations, reinforcing uneven tourism development.

Introduction

This study investigates the role of artificial intelligence in travel planning apps. Generative AI has garnered significant attention across multiple industries in recent years due to its economic potential. Although the adoption of AI in travel and tourism has progressed more slowly than in other industries—partly due to the complexity of travel consumption, which involves multiple stakeholders and fragmented supply chains—the pace of its adoption by companies is now accelerating, thus marking what Van der Vlist et al. (2024a) term the 'industrialisation of AI'. While AI's role in current travel apps remains largely limited to booking management, itinerary creation, and chatbot assistance built on top of ChatGPT's large language model, its capabilities are expected to grow in both scope and complexity. An increasing number of companies, including travel giant Expedia and Silicon Valley-based

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start-up Mindtrip Inc., are developing their own 'all-in-one' apps that promise to transform how users organise and experience travel.

The AI-fication of travel thus represents a shift from a process that usually demands considerable manual effort, where scattered booking confirmations, spreadsheet creation, and fluctuating airline prices make trip planning fragmented and time-consuming. These developments reflect a wider dynamic of *appification* (Dieter et al., 2019; Van der Vlist et al., 2024b) where mobile apps consolidate formerly dispersed services into a single, digital environment. However, within this context, AI travel planning apps are far from neutral intermediaries or tools of convenience. Rather, they function as sites where platforms exert strategic and infrastructural power through the co-optation of users as content creators, and alliances forged through business-to-business (B2B) programs that limit competitor access (Van der Vlist and Helmond, 2021). Travel apps, therefore, do not function merely as service providers but as AI-powered mediators within highly complex partner ecosystems, where artificial intelligence becomes a key mechanism in attracting new players, orchestrating integrations, and optimising data collection across platforms.

While much of the current discourse surrounding artificial intelligence in travel is rooted in business marketing that emphasises convenience and innovation, there remains a lack of critical engagement with how these apps operate and mediate platform power. This report addresses this research gap by investigating the current use of generative artificial intelligence by existing AI travel apps as well as how upcoming apps are planning to adopt it in the future. Our research is guided by the following question: *How do AI-driven travel planning apps frame and implement AI, and what do these framings reveal about the appification of travel within platform economies?* To investigate this, we employed a mixed-methods approach, conducting an app store analysis and multiple walkthroughs (Light et al., 2018). Additionally, we examined how artificial intelligence intersects with B2B partnerships, application programming interfaces (APIs), and content creation by analysing the partnership and developer pages of two additional apps and their associated platforms. In doing so, we contribute to broader discussions on the socio-technical implications of AI integration in both consumer-facing and business-facing travel applications.

Literature Review

In recent years, AI has gained popularity within the travel industry, particularly through promises of automating and personalising travel processes (Koo et al., 2021, p. 474). This aligns with a general technological shift taking place in all kinds of sectors, moving from web-based to app-based models. This phenomenon is called 'appification', where daily services that were traditionally accessed through websites or diverse online tools now take place on mobile applications (Dieter et al., 2019; Dieter et al., 2021; Goggin, 2021; Morris and Murray, 2018; Van der Vlist et al., 2024b; Van der Vlist, 2025).

Building on the concept of appification, Van der Vlist et al. (2024b) describe the emergence of ‘super-appification’ within the context of global digital economies. These apps are so encompassing in their functionality that they are coined ‘Swiss-Army knife’ apps (Van der Vlist et al., 2024b, pp. 1–2). In a comparative case study of China’s app economy, Jia et al. (2022) argue how platform power manifests itself in app economies (Jia et al., 2022, p. 1437). This goal towards a total service integration aligns with an increasing reliance on AI models through their APIs, something Van der Vlist et al. (2024a) call the ‘industrialisation’ of AI, which in turn enables developers to integrate these models into their own applications (Van der Vlist et al., 2024a, pp. 1–2). Furthermore, it is emphasised that apps operate within dense platform ecosystems, with front-end components such as the Apple App Store or Google Play and other major stores mediating their visibility, ranking, and overall user uptake (Morris and Murray, 2018, p. 5). However, Van der Vlist and Helmond (2021) shift attention to the back-end infrastructures that give insight into these platform ecosystems, revealing how business-to-business partnerships in social media are key to understand how ‘platforms mediate and shape’ their ‘power and governance’ structures (Van der Vlist and Helmond, 2021, p. 1).

In response to these structural developments, media scholars have also moved to interface-centred analysis to research how apps frame user experiences (Light et al., 2018). One of these techniques is the walkthrough method, which entails systematically recording step-by-step actions like the installation, sign-up, usage, and even discontinuation of apps to reveal how functionality, design, and rhetoric frame the user experience (Light et al., 2018; Duguay and Gold-Apel, 2023). However, in a following study of 2023, several limitations of the walkthrough method are discussed, mostly regarding technological advancements (Duguay and Gold-Apel, 2023). Light et al. (2016) draw further upon various media studies scholars' writings on affordance theory, emphasising that affordances are perceptions largely shaped by the design and sociocultural contexts, and not merely by options provided by a system (Light et al., 2018, p. 886). The concept of affordances, discussed by Light et al. (2018) and Davis (2020), further offers a lens in understanding how apps themselves can influence user experiences. Furthermore, the ‘multi-situated’ perspective by Dieter et al. (2019) draws attention to how the affordances of apps exist as software packages and bridges to ‘broader infrastructural settings’, entangled with trackers, advertising interfaces, and API functions (Dieter et al., 2019, pp. 1, 8). Moreover, apps aim to build credibility through user interface (UI) design and language choices like 'personalised recommendations'. In relation to this, scholars like Dieter et al. (2019) connect these tactics to the embedding of apps in various societal structures like cultural, social, and political-economic dynamics (Dieter et al., 2019, p. 1). Following this logic, users granting apps extensive data permissions for said personal recommendations could potentially risk exposing themselves to privacy risks while simultaneously feeding into the platform's monetisation models (Light et al., 2018, p. 890).

User experiences are also discussed in broader digital ethnography studies that situate interface design within everyday life, pushing their analysis beyond technology itself to consider the application's cultural contexts, policy frameworks, and user experience patterns (Richardson and Keogh, 2017). While no comparative study has yet specifically focused on AI-centred travel planning apps, these theoretical approaches form a foundation for understanding how such apps are embedded in broader cultural and social imaginaries. One of these comparable studies is written by Deborah Lupton (2014), who approaches medical apps as 'sociocultural artefacts', arguing that they are 'digital objects that are products of human decision-making'. These structures are, according to Lupton (2014), already set in place by pre-existing norms and assumptions that are embedded in cultural and social structures, which are in turn reused in marketing and generated content (Lupton, 2014, p. 606).

This review highlighted the broader thematics relevant to understanding the landscape of AI-driven travel planning apps and their relation to phenomena like appification and their cultural context. Hereby, a general framework is established for analysing AI travel planning apps through interface studies and theoretical frameworks related to platform and app studies. For this research, the thematic intersection of affordances, cultural imaginaries, and platformisation is useful for exploring the AI-fication of travel planning apps.

Data and Methods

Our research employs a mixed-method approach to comprehensively examine the impact of artificial intelligence on travel applications. The combination of qualitative and quantitative techniques allows us to map the landscape of AI travel apps, analyse their infrastructural situatedness within app stores, and perform detailed walkthroughs of user interactions. This approach aligns with the multi-situated framework proposed by Dieter et al. (2019), emphasising that apps are embedded within complex socio-technical infrastructures and are best understood through multiple entry points that reveal their relational and contextual dynamics. There are three stages in the mixed-method: mapping the AI landscape within the travel sector through a review of literature, news reports, and platform analyses; an app store analysis using the App Studies Capture & Analysis Toolkit; and a detailed walkthrough analysis for eight chosen travel apps. This design allows us to move from a macroscopic view of how artificial intelligence is positioned in the travel-app marketplace to a microscopic inspection of how AI functions are rendered meaningful in everyday use.

The first stage involved reviewing relevant literature, news reports, and platform analyses to identify typical AI application paths within the tourism sector. We explored industry media, technology blogs, and AI plug-in pages in the GPT Store to understand functionalities such as itinerary generation and automatic recommendations.

In the second stage, we formulated an app store analysis and systematically sampled AI travel apps from both the Apple App Store and Google Play Store. The app store analysis is grounded in the growing body of methodological work that conceptualises app stores as infrastructural sites that actively shape app visibility, circulation, and socio-cultural meanings. App stores such as Apple's App Store and Google Play serve as key sites for exploring how apps are organised, ranked, and recommended within platform economies (Dieter et al., 2019). In the context of AI travel applications, app stores are not merely repositories but serve as active mediators of cultural and economic practices through their algorithms, curation policies, and ranking mechanisms. These app stores, as infrastructural sites, shape the relational networks of AI travel apps, mediating which applications gain prominence and how they are positioned within the broader travel technology ecosystem. This approach allows for understanding how ranking algorithms and curatorial practices not only organise app collections but also reflect and reinforce cultural norms, biases, and economic interests specific to the AI-driven travel applications.

Using keywords such as 'AI travel' and 'AI Travel Planner', we identified relevant apps. We categorised the results based on functionalities, search rankings, and appearance frequency, ultimately selecting eight representative apps that exemplify core features such as AI trip planning, chatbots, community features, and monetisation strategies. Complementing the infrastructural app store perspective, we involved a comparative study of the selected apps in the last stage using the walkthrough method (Light et al., 2018). This approach analyses applications from the user's perspective, allowing us to systematically observe the application's registration process, interactive interface, function settings, AI presentation, and commercialisation mechanism. The walkthrough method combines principles from science, technology studies (STS), and cultural studies, enabling an analysis of app interfaces, features, and socio-cultural implications (Light et al., 2018). It begins by identifying the app's vision, operating model, and governance to understand anticipated user interactions. We conduct a step-by-step walkthrough of the app's registration, everyday use, and discontinuation processes, meticulously documenting symbolic AI functions. By engaging directly with the apps, we could assess how specific design elements influenced user interaction within a broader socio-cultural context.

The walkthrough method uncovers embedded cultural meanings and highlights how apps guide user experiences and reinforce particular norms. This approach provides insights into the intended purposes of the app and explores how users may resist or appropriate the technology for their own needs. Digital cultural studies perspectives emphasise the interplay between technology and culture, acknowledging how digital platforms influence and are influenced by societal dynamics. Through this, we can better understand how design choices in the apps facilitate user engagement while reflecting and shaping cultural narratives surrounding AI trip planning.

Lastly, we analysed emerging AI travel applications, Romie and Mindtrip, along with their associated platforms, through a critical reading approach. This involved examining the information available on them across various sources, including news articles, videos, blogs, and niche tech content from industry-specific publications such as Axios, PR Newswire, Web in Travel, AI Expert Network, Skift, and Global Brands Magazine due to their relevance to the travel and tech industries. We also examined the Creator Page, Creator Program Agreement, and Partnership Page of Mindtrip.ai, as well as the Partnership Page and Developer Page of Expedia Group (the parent company of Romie) to investigate how artificial intelligence and API integrations fit within their applications and partnership programs. This multi-sided approach enabled us to understand how industry players govern through techno-material elements to establish themselves as AI-enabled mediators and central nodes within the broader audience economy. Additionally, it illuminated how they embed the infrastructures of large AI providers while integrating social media platforms and third-party messaging services to reinforce their strategic and infrastructural power.

Analysis and Findings

App Store Analysis

To study how AI travel apps are represented in the market, we used the App Studies Capture & Analysis Toolkit to systematically sample relevant apps in the Apple App Store and Google Play Store. We drew on the ‘multi-situated app studies’ proposed by Dieter et al. (2019) and viewed app stores as an infrastructure with its own internal mechanisms, sorting rules, and

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platform logic. We first searched for 'AI travel' to identify key features in the application domain. We collected a lot of data, but many applications are not related to the topic of this research, such as translation tools, weather forecast software, and general AI chat tools.

Figure 5.1. Apple App Store search results for the query 'AI Travel'.

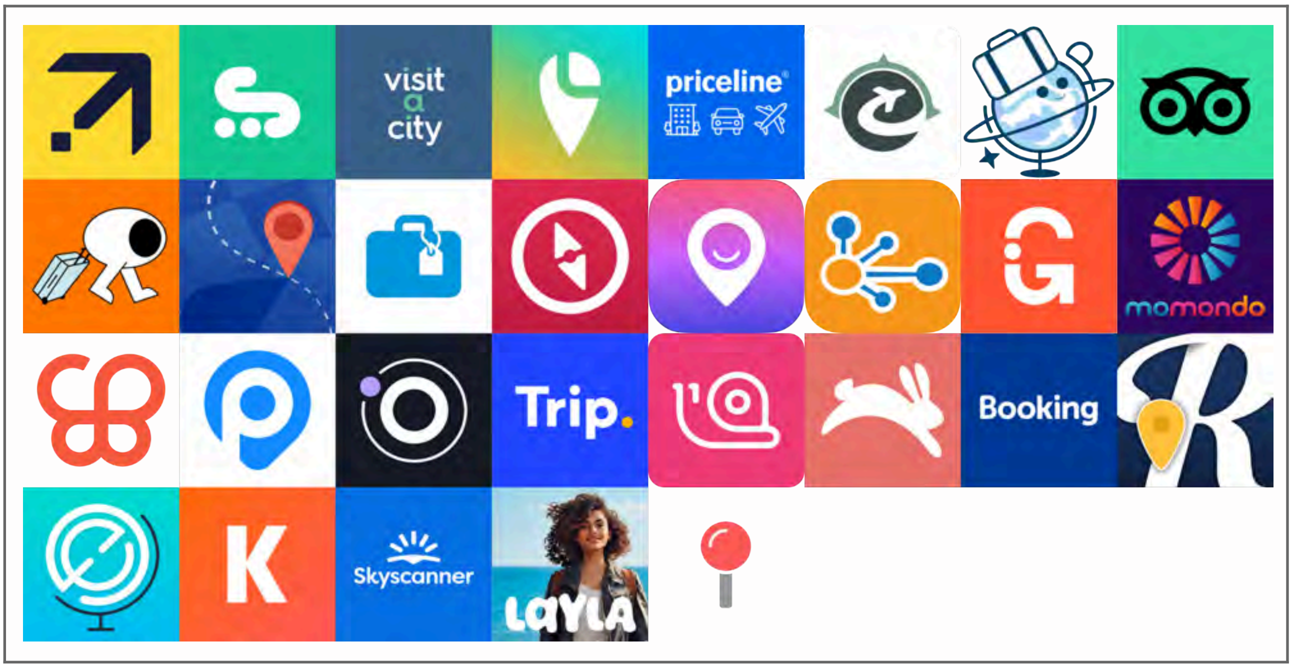

Figure 5.2. Google Play Store search results for the query 'AI Travel'.

We tried searching multiple queries in both app stores, such as 'AI travel', 'AI itinerary', 'smart travel assistant', and 'travel AI chatbot'. However, most of the searching queries

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returned scattered results or contained a large number of apps that were not relevant to the study. In contrast, the keyword 'AI trip planner' generated the most concentrated and relevant app results on both platforms, so we used it as the main search term for the final sampling. By using the more precise search term 'AI Travel Planner', we found 150 relevant results. We collected basic information about these apps from the stores, including: (1) app name and developer, (2) category label and function description, (3) preview screenshots, icons, and rating rankings. We noticed that many apps use terms such as 'AI intelligence', 'your personal travel consultant', or 'just enter the city and AI will do it for you' in their store descriptions. This way of expression makes AI look like an 'advanced', 'smart ', and 'trouble-free' assistant rather than an auxiliary function. In addition, we also found that many key AI functions are set as paid content in the App Store, such as unlimited chat, automatic route optimisation, and complete itinerary download. AI has become a function that needs to be unlocked. This also shows that 'intelligence' itself is being commodified.

The search results from the two app stores are different, with more results from the Apple App Store and fewer results from Google Play. In addition, there is some overlap in the search results. Therefore, we decided to interpret these results together. We thematically categorised this dataset through an inductive coding process. We categorised the apps manually based on their main features and value proposition. Themes included AI trip planning, AI chatbot assistance, real-time recommendation engines, route optimisation and logistics, community-based trip sharing, and a freemium model profit structure. From these, we selected eight representative and functionally diverse AI travel apps. Our selection criteria included the frequency of their appearance in both app stores and their search rankings. Additionally, we thoroughly examined app icons, descriptions, screenshots, and other app store information to identify apps that aligned most closely with our research goal of exploring the AI trip planner category in more depth.

Walkthrough Analysis

App Title	Tagline/ Promotional Language	AI Functions		Community Feature		Monetisation		
		AI Trip Planning	AI Chatbot/ Assistant	Friends/ Collaboration	Public Itinerary	Subscription (Extra Functions)	External Purchase Link (Tourism Products)	In-App Purchase (Tourism Products)
LAYLA	Discover, plan & book	✓	✓				✓	

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	trips in one place using AI. Don’t search, just ask Layla.							
iplan	Your smart travel planner. We'll create your smart itinerary with the help of artificial intelligence.	✓			✓	✓		
Tourist	Planning your trip has become easier. Now you can travel with AI!	✓	✓	✓	✓	✓		
TripMaker	Tripmaker creates customised itineraries in 60 seconds or so, and then the real magic starts…	✓		✓	✓	✓	✓	
Roam Around	ChatGPT powered day plans for your	✓				✓	✓	

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	next vacation.							
Nowy	AI Travel Content Planner, Your AI Hotel Scout & Price Detective!	✓	✓		✓		✓	
PlaninGo	AI Trip Planner, Hotel Matchmaking = Levelled Up.	✓	✓					✓
Stippl	Plan with AI - Your Perfect Trip in 2.	✓		✓	✓	✓	✓	

Table 5.1. Findings of the selected AI travel apps.

Framings of AI in Travel Apps

With the analysis of the app store descriptions of these apps, people can gain insights into how apps position themselves and pre-defined scenarios of use (Light et al., 2018, p.889). We found that many apps position themselves as 'companions', leveraging anthropomorphic interfaces to create emotional resonance. Apps like *LAYLA* employ conversational chatbots with informal, friendly language and personified avatars to evoke warmth and approachability. Visual elements always include rounded icons, warm colour schemes, and emojis, such as Tripmaker's pumpkin, which help foster emotional engagement. 'Expert' is another frequently-used framing. This framing prioritises authority, efficiency, and precision, catering to users who prioritise data-driven decision-making. Design elements here emphasise algorithmic rigour and the language shifts to more assertive and professional tones. Frequently-used words include 'smart', 'in a matter of minutes', and 'professional'. Marketing materials highlight reliability and AI's predictive capabilities, and some underscore the AI model they use or their partnerships with established brands (like 'Powered by OpenAI') to bolster credibility. The 'tool' framing, meanwhile, positions AI as a utilitarian aid, prioritising functionality. Apps like *Roam Around* emphasise ‘automated organisation’ or ‘real-time updates’, framing AI as a practical planner without anthropomorphism. This framing reflects a pragmatic sensibility where users view AI as an extension of their agency, avoiding personification to maintain neutrality.

Functionality and Interface

Despite bold claims, most apps are still limited to itinerary generation, travel inspiration, and Q&A features, mainly focused on AI-text generation and chatbots. The interfaces are clean and intuitive, but rough, like *LAYLA* and *Roam Around, which* only have two main interfaces in the whole app. And functions are often basic, relying heavily on external booking platforms. However, it is worth mentioning that LAYLA portrays an anthropomorphic AI travel assistant and uses this persona in the chat box, which helps to increase intimacy with the users and enhance the interactive experience. And *Tourist* incorporates an ‘AI with community’ ecosystem that facilitates collaborative trip organisation. When travellers create their journeys, these itineraries become stored within a collective repository accessible to all users. Other users can also see the shared content and adjust their own plan based on this data. This establishes an ongoing improvement cycle where accumulating travel plans generates richer data. This mutual exchange allows the platform to develop progressively through accumulated user contributions.

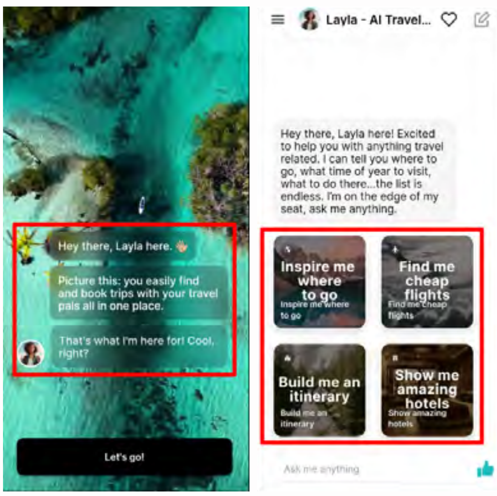

Figure 5.3. Screenshots of the welcome page and chat interface of *LAYLA*.

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Figure 5.4. Screenshot of the 'AI with Community' functionality of *Tourist*.

Monetisation

Most apps use a mix of monetisation: subscriptions for premium features, commission-based referrals to booking sites, and in-app ads, even requiring users to watch ads before accessing features (Figure 5.5). We found that most apps have a purchase link to other big travel booking companies. The website of LAYLA shows that it has partnered with Skyscanner, Booking.com, and other well-known mainstream travel platforms, therefore, it is able to provide real-time price references and booking options for flights and accommodation directly within the app. This raises questions about user autonomy and commercial bias.

Figure 5.5. Screenshot of the integrated ads functionality of *Roam Around*.

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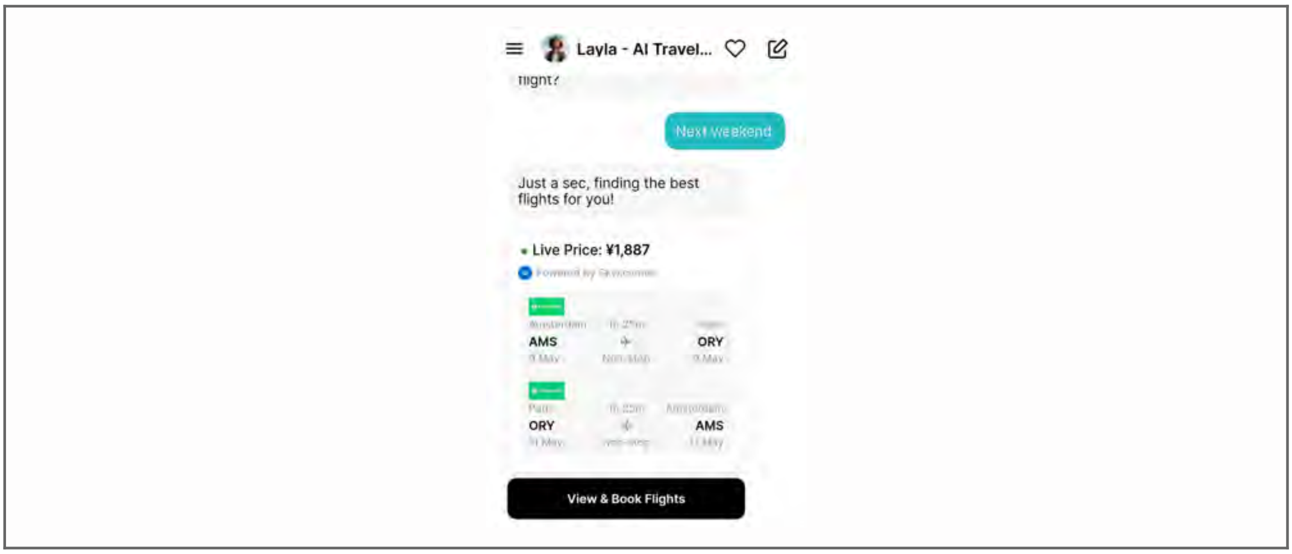

Figure 5.6. External purchase link in *LAYLA*.

Artificial Intelligence in Content Creation and B2B Partnerships: The Cases of *Mindtrip* and *Romie*

Despite still being in the developmental stages, aspirational apps Romie (from Expedia's EG Labs) and forthcoming *Mindtrip* (from Silicon Valley-based startup Mindtrip, Inc.) have positioned themselves as frontrunners of AI-driven travel planning in media discourse. Promising to offer an amalgamation of services consolidated into single, niche 'one-stop-shop' apps for travel, these applications incorporate AI-powered review aggregation, real-time itinerary adjustments, content creation tools, and voice-enabled personalised tour guides (Global Brands Magazine, 2024; Trending AI Tools, 2024; Axios, 2024). Representatives for *Mindtrip* and *Romie* have expressed wanting to make travel and the travel planning process more efficient and hyper-personalised, with their products serving as enhanced versions of traditional travel industry intermediaries, such as travel agents, tour guides, and concierges (CNBC, 2024; AI Expert Network 2025). The adoption of artificial intelligence in the travel industry thus marks what Van der Vlist et al. (2024a, p. 1) term the 'industrialisation of AI', whereby AI systems have matured from a nascent research stage to enter various industry sectors as 'practical, real-world commercial products and services'.

The bundling of services into sector-specific AI-driven travel applications reduces user reliance on competing apps and search engines, thereby granting the companies behind them greater control over the visibility of information and how it is accessed within their platforms. At the same time, this opens up possibilities for corporate partnerships and integrations with third-party developers and services, facilitating the orchestration of platform ecosystems whereby artificial intelligence is further industrialised (Van der Vlist et al., 2024a, p. 12).

Expedia's travel assistant, Romie, for example, works internally within the Expedia ecosystem and can be integrated into iMessage chat groups or WhatsApp (Web in Travel 2024; Expedia Group 2024), leveraging OpenAI's ChatGPT to facilitate:

- *Group Chat Trip Planning:* Romie is integrated into SMS group chats, where it collects user-shared information. Users can type @Romie to ask for personalised travel recommendations.
- *Smart Search:* Romie summarises group chats and extracts trip information, using this data to funnel users towards tailored service recommendations within the greater Expedia landscape. For example, accommodation recommendations based on specific filters (e.g., 'rooftop views' or 'early check-in') on the Expedia Group-owned Vrbo or Hotels.com platforms.
- *Itinerary-building:* Romie extracts travel information from users' emails (e.g., booking confirmations) to build custom itineraries.
- *Intelligent Assistance:* Romie facilitates real-time updates of itineraries based on user-shared information (e.g., flight times, activities), allowing users to stay coordinated and informed throughout group trips.

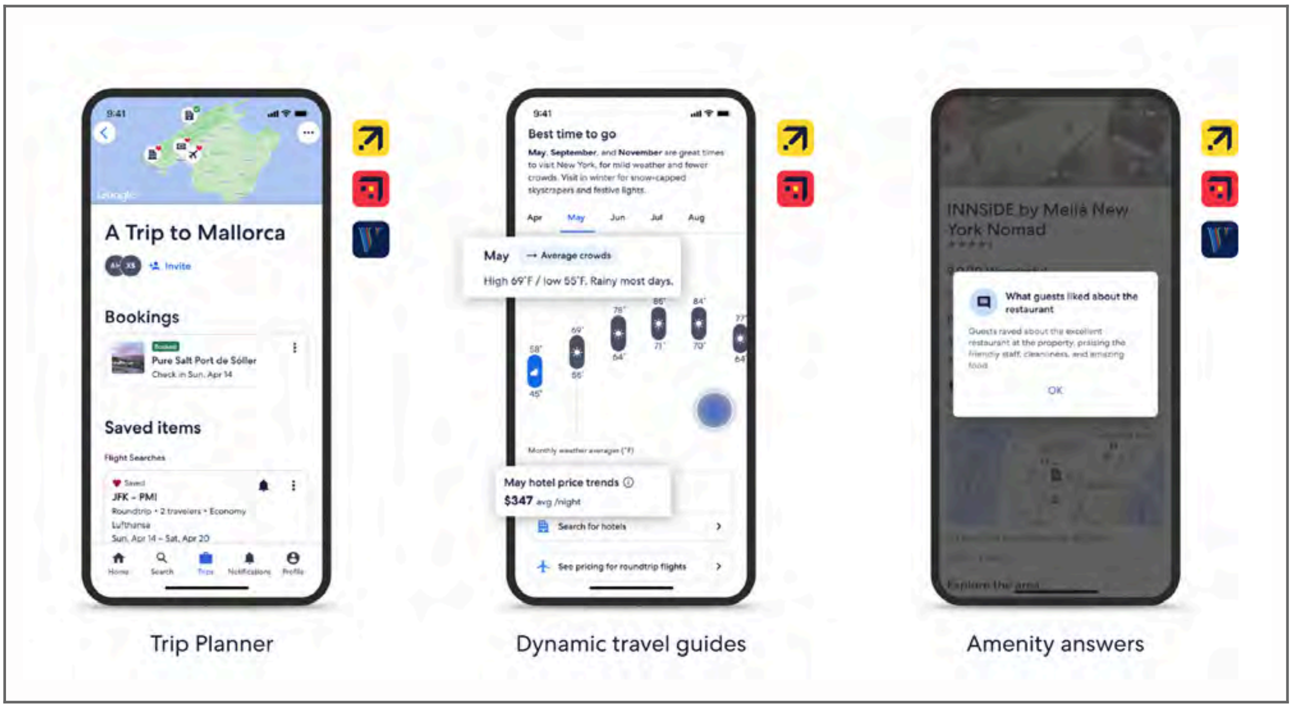

Figure 5.7. The alpha version of *Romie* uses AI to coordinate information across Expedia Group's *Vrbo*, *Hotels.com*, and *Expedia* apps in a unified travel ecosystem (Source: Expedia Group).

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Magic Links, Travel Shops, and Content Creation

Mindtrip and *Romie* position themselves not only as collaborative planning tools to be applied across every stage of travel, but also as spaces for 'self-expression' and micro-entrepreneurial activity through AI-powered and AI-assisted content creation. Mindtrip encourages influencers to join its Creator Academy to 'monetise their expertise' as 'local experts' with the distribution of so-called Magic Links (Mindtrip, 2025). Magic Links are personalised, AI-powered referral URL links that track user engagement. These links allow Mindtrip creators to earn performance-based commissions of $1 whenever new users register for a Mindtrip account, purchase travel itineraries, services, or products through them. Mindtrip's *Start Anywhere* feature also incorporates ChatGPT's infrastructure to extract and process user-generated content, where users provide inputs (e.g., PDFs, TikTok videos, images, news articles, or travel-related receipts) that are used for automated itinerary building and personalised recommendations.

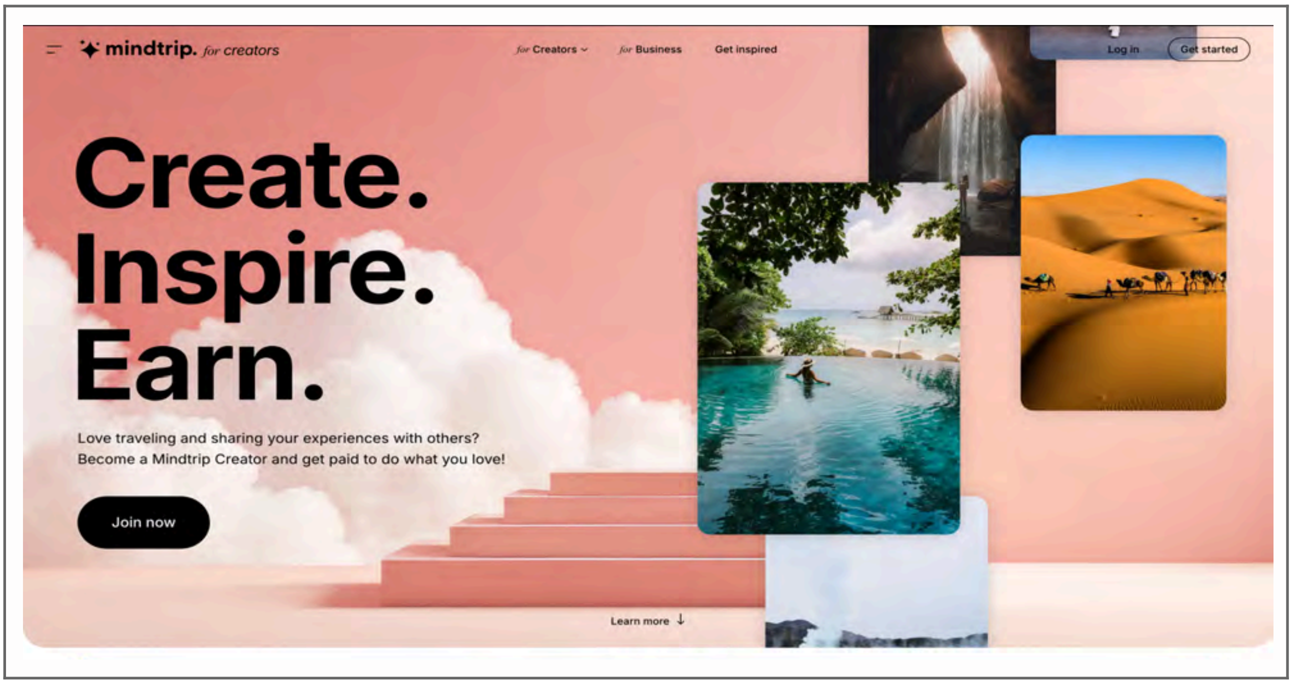

Figure 5.8. Screenshots of *Mindtrip.ai*'s 'for creators' web page, where creators can generate affiliate links.

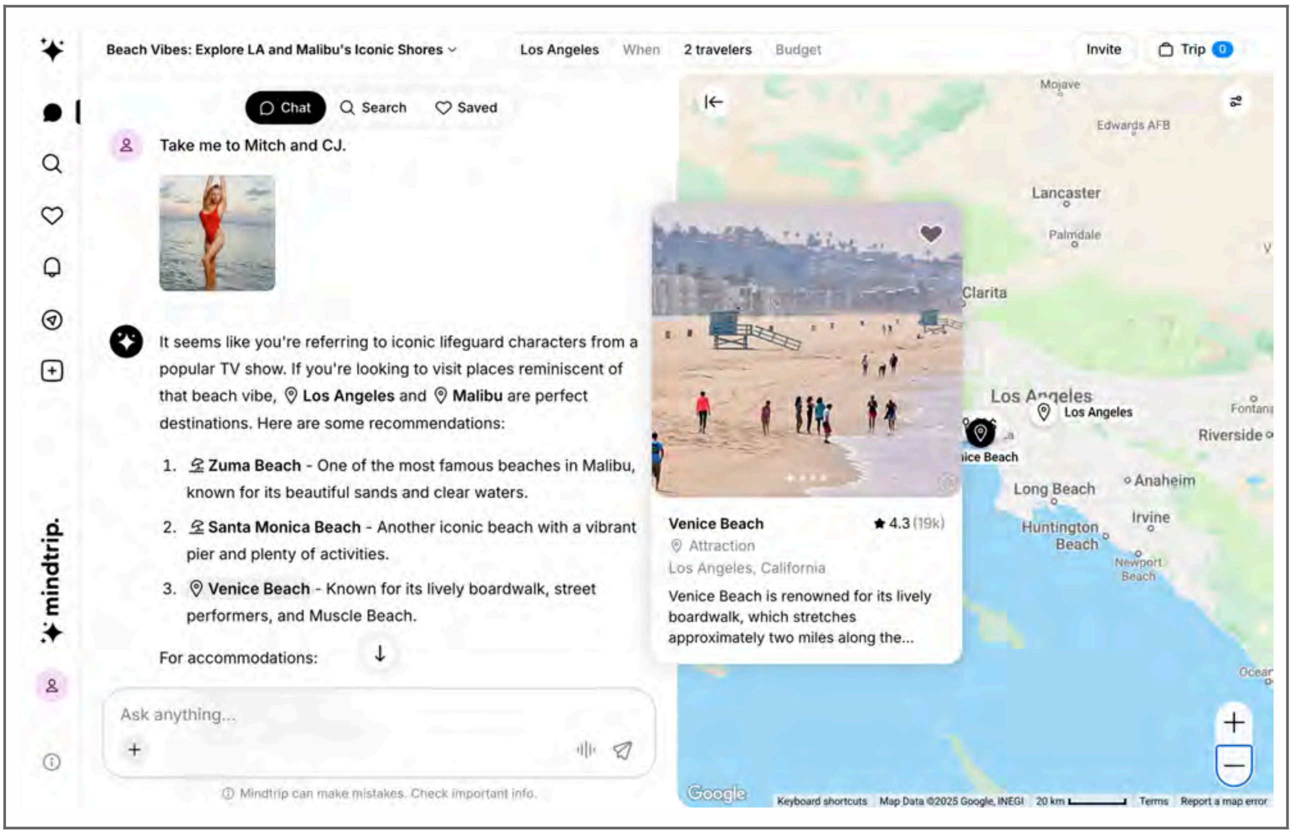

Figure 5.9. *Mindtrip* integrates ChatGPT into its 'Start Anywhere' feature to generate travel recommendations based on user inputs.

Similarly, Expedia Group has announced the launch of its *Travel Shops* which function as marketplaces where influencers can earn commissions on travel recommendations (Phocus Wire, 2024). These shops integrate artificial intelligence features that assist influencers in curating hotel suggestions, activities, and travel products that they recommend to their audiences. Engagement is fostered through searches, purchases, tagging, linking, and image sharing, with integration across established social media platforms (i.e., infrastructures for media contributions)—Instagram, YouTube, and TikTok. The software infrastructures of these social media companies facilitate the distribution process and enable the 'consolidation of data sources' within the broader audience economy (Van der Vlist and Helmond, 2021, p. 11). This audience economy, as defined by Van der Vlist and Helmond, is 'a complex global and interconnected marketplace of business intermediaries involved in the creation, commodification, analysis, and circulation of data audiences for purposes including but not limited to digital advertising and marketing' (Van der Vlist and Helmond, 2021, p. 3).

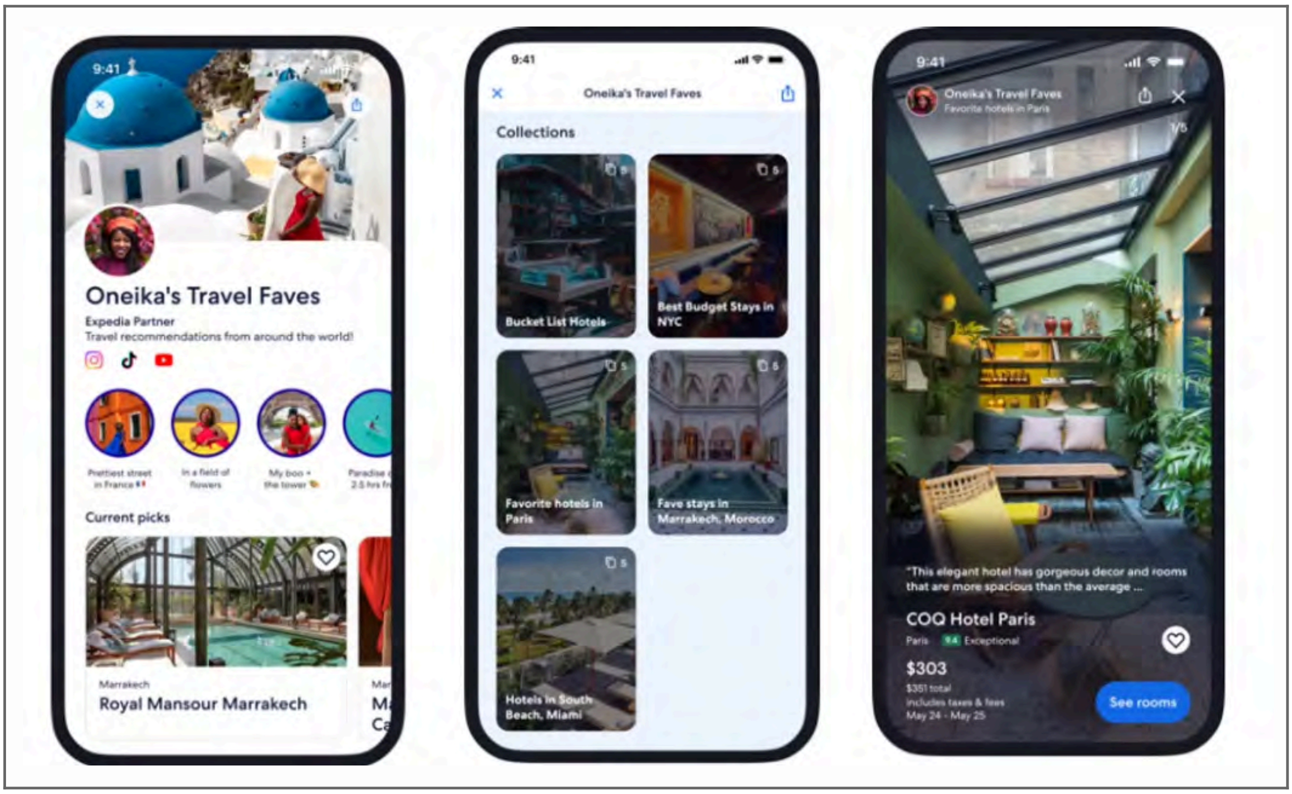

Figure 5.10. Expedia Group's 'Travel Shops' facilitate a seamless, influencer-driven shopping experience, similar to Amazon Storefronts.

'Social media platforms are uniquely positioned within this complex ecosystem because they play a significant role both on the consumer side of the market (e.g., with access to billions of consumers worldwide, across many websites and apps) and the publisher side of the market (e.g., with sophisticated programmatic and self-serve advertising tools and advertising inventory)' (Van der Vlist and Helmond, 2021, p. 2). For AI-powered travel apps like Mindtrip and Romie, this positioning is critical as it allows them to extend their reach and cultivate large, active user bases that both consume and generate content, feeding continuous engagement back into their platforms. In this way, users become co-creators, contributing value to the platforms' ecosystems through complementary tools and software (Van der Vlist and Helmond, 2021, p. 4). As noted by the authors, industry players increasingly integrate with social media to engage in the audience economy through partnerships and software integrations. In this context, Mindtrip and Romie leverage such integrations, alongside generative artificial intelligence, to maximise user engagement, which in turn contributes to the circulation of data and data audiences and extends their ecosystems.

Business-to-Business (B2B) Partnerships and Rapid APIs

Meanwhile, business-to-business (B2B) partnerships act as strategic alliances that extend platform infrastructures and afford companies ‘exclusive access to proprietary data and third-party services’ (Van der Vlist and Helmond, 2021, p. 8). The business-to-business (B2B) model, coupled with artificial intelligence, is a key strategy driving the rapid scalability of these apps and their associated platforms. Examples are *Mindtrip's* ‘Mindtrip for Business’ and Expedia Group's partnership programs, where AI serves as a mechanism for attracting new partners and deepening interdependencies.

Mindtrip for Business is marketed by Mindtrip as a ‘B2B solution’ that allows businesses, tourism boards and Destination Marketing Organisations (DMOs) to leverage its infrastructure, visibility, user base and AI-powered capabilities—whether it be to promote their own services, local companies, or destinations (PR Newswire, 2024). Once plugged into the *Mindtrip* platform, partners become locked within a backend structure defined by its logic, which deepens corporate and infrastructural interdependencies that encourage continued participation within its ecosystem. In this context, Mindtrip centres itself as a critical node that connects various actors within a complex partner network, and where it benefits from relationship advantages by being closely connected to both users and various stakeholders. This positioning, compounded by an opacity bias—’i.e., a lack of transparency as to how programmatic advertising “works”’ (Van der Vlist and Helmond, 2021, p. 3)—lends *Mindtrip* a form of strategic power. As a result of this ever-expanding constellation of partnerships, access for competitors is restricted.

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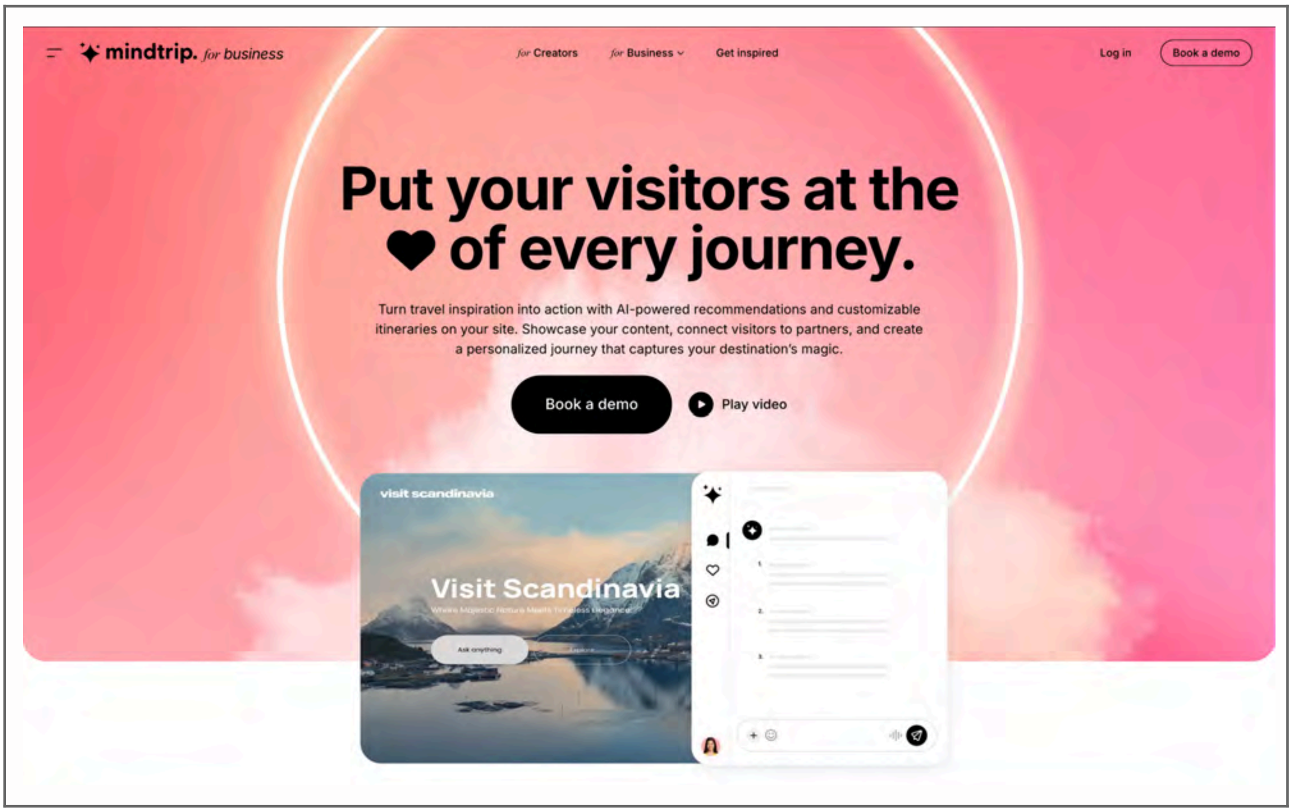

Figure 5.11. Screenshot of *Mindtrip.ai*'s 'for business' web page, employing a distinct neoliberal and aspirational rhetoric, inviting companies to leverage its AI capabilities and become part of a larger network.

Meanwhile, Expedia Group has released Rapid APIs that enable third-party apps and platforms to integrate Expedia's AI-powered services into their own systems, embedding them as 'Rapid API partners' within an expansive B2B landscape, as outlined on Expedia's partnership page (Expedia Group, n.d.). Through this integration, Expedia centralises control over a vast repository of lodging inventory, content, and user-generated data, selectively distributing controlled access to it to third-party partners. In return, partners gain infrastructure and AI-driven tools designed to enhance user experience and scalability through personalised recommendations, dynamic pricing, and privileged property rates (Expedia Group, n.d.). Business-facing software tools, including APIs, are a critical element of the programmatic landscape, as they allow partners to integrate Expedia's data and functionalities into their own systems. While this may appear beneficial to partners, it further entrenches Expedia's dominance, amplifying its market influence and reinforcing power asymmetries in the travel sector. As Van der Vlist and Helmond (2021, p. 3) note, 'power is dispersed and exercised through infrastructure, wherein the gateway function of APIs is an important source for this "infrastructural power" held by platforms'. In this context, Expedia Group's Rapid

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APIs extends its infrastructural power across a larger ecosystem and network of stakeholders, where an increasing number of actors are drawn in by the competitive edge promised by Expedia's AI-powered services and B2B program, to a backend landscape that it defines and governs.

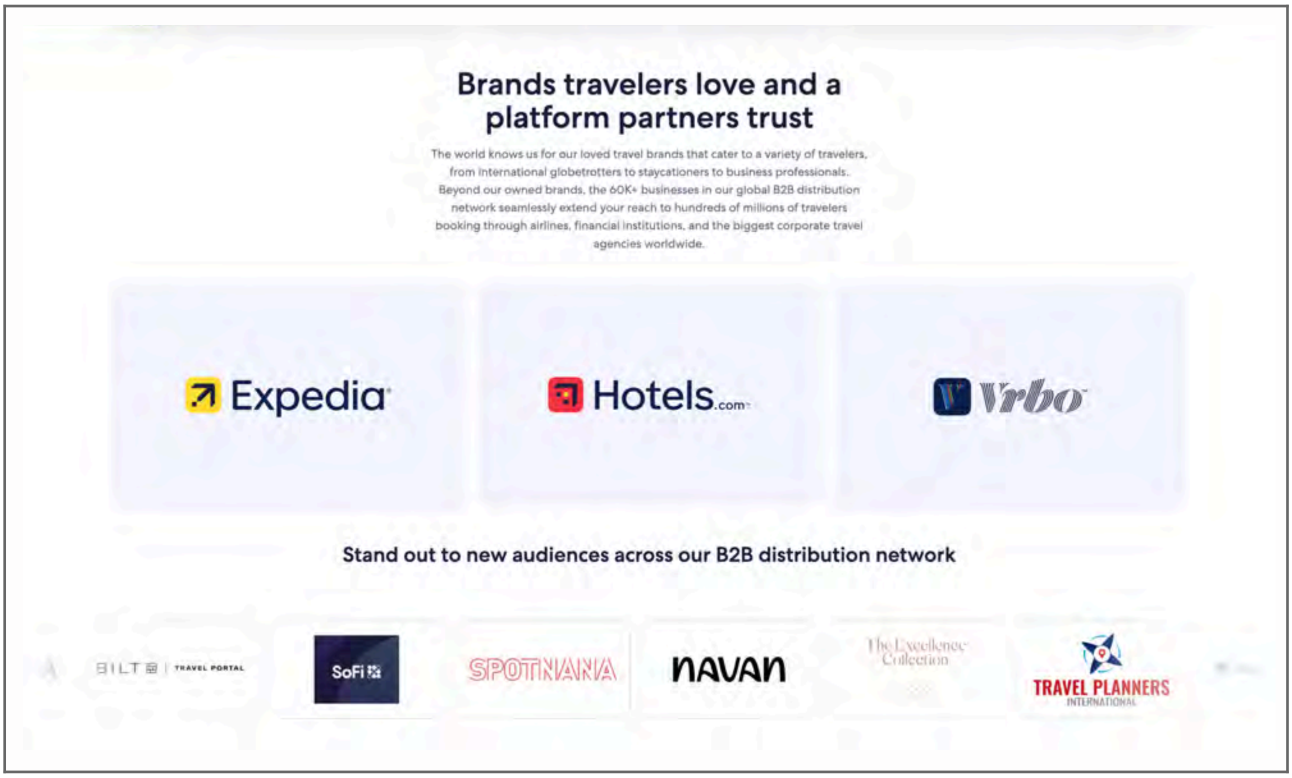

Figure 5.12. Screenshot of Expedia's partnership page, highlighting a B2B network of 60,000+ businesses, including airlines, financial institutions, and agencies, framed through a rhetoric of brand loyalty and trust.

Discussion

The Framing of AI in Travel Apps as Companion, Tool, and Expert

With the walkthrough method, we found that AI-driven travel apps strategically frame AI through design and marketing to shape user perceptions. These framings shape how users perceive and interact with AI, naturalising its role in mediating travel experiences. At the same time, they obscure the underlying processes of data extraction and the consolidation of services typical of platform capitalism.

The companion framing leverages anthropomorphic interfaces to extract affective and behavioural data under the guise of relational trust. Apps like *LAYLA* employ conversational chatbots with informal language, deploying emotional design tactics, such as rounded icons

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and warm colour schemes. Meanwhile, Tripmaker's pumpkin mascot fosters emotional engagement while masking the transactional reality of data commodification, namely, that user-defined preferences may become training data for algorithmic personalisation. Under this framing, users willingly contribute data through 'friendly' interactions, unaware that their itineraries feed into closed-loop ecosystems that prioritise third-party partnerships over user autonomy. As Wang and Noorliza (2024, p. 486) note, biased AI algorithms may perpetuate long-lasting discrimination—a risk that remains obscured under the friendly companion framing, where travelers are left unaware of these implications.

Apps like *iplan*, on the other hand, deploy assertive language such as 'professional as an expert' and technical signifiers ('Powered by OpenAI') to construct AI's authority. This framing naturalises an asymmetric power dynamic in which users defer decision-making to ostensibly 'smart' systems that, in practice, prioritise commercial partnerships, such as iplan's integration with GetYourGuide, under the guise of neutrality. However, an AI-generated 'budget-friendly' itinerary may exclude locally-owned hostels simply because they are not integrated into the app's API.

The tool framing, meanwhile, positions AI as a utilitarian aid, prioritising functionality. Apps like Roam Around emphasise 'automated organisation' and 'real-time updates', framing AI as a practical planner without anthropomorphic traits. This framing reflects a pragmatic sensibility where users view AI as an extension of their own agency, avoiding personification to maintain neutrality. However, by perceiving AI as a neutral tool, users may be unaware that real-time adjustments rely on scraping their data to feed proprietary recommendation engines.

Many apps, however, blend these services in an attempt to become niched, sector-specific, 'one-stop shops' in the AI-travel landscape. According to consultancy firm Accenture (2024, p. 14), 97% of travellers desire a comprehensive all-in-one app that integrates flights, accommodations, and activities for a more seamless experience. Whether positioning AI as empathetic, authoritative, or instrumental, all of these framings mediate between user trust, functional utility, and platform economics, while advancing the interests of travel apps themselves. This kind of cultural work is central to the amplification of AI, shaping not only travel practices but also broader perceptions of technology's role in everyday life.

Observations and Reflections on Affordances

According to Davis, it is important to determine how technology requests, demands, encourages, discourages, refuses, and allows when looking deep into the politics and power dynamics behind it (2020, p.17). Through our study of eight AI travel planning apps, we found that they have common features of singular function combined with simple, intuitive interfaces. From the perspective of affordances, this reflects that AI travel apps may still be in a relatively underdeveloped stage. Furthermore, the use of AI lacks novelty or user experience enrichment, which mainly manifests in the sections of travel inspiration, creating travel plans, and answering specific questions in real time.

However, it is worth mentioning that some apps, such as Tourist, whose community function embodies the underlying logic and advantages of AI, form an ecosystem by collecting and sharing user-generated and AI-generated information. User-generated and AI-generated data, which can be regarded as an important strength compared to others that do not use AI. Overall, AI affects users' travel choices and experiences. The AI technology provided by travel applications, including informativeness, playfulness, and personalisation, plays a significant role in users' perception and travel choices (Luo et al., 2024, p.2).

To some extent, AI may improve the travel experience for users. However, this mainly applies to the pre-travel preparation of the trip and does not address issues encountered while travelling. It is furthermore found that apps have done a poor job of confronting these issues, such as how to use the local public transport. According to Schneiderman, the design of the system should emphasise user control and freedom (2009, p. 446), and AI travel applications reconfigure user agency by mediating between automated content generation and customisation to user requirements. In addition, relying on AI for decision-making risks creating situations such as recommending only popular destinations, making popular destinations more and more popular.

In contrast, other destinations go unnoticed, reinforcing the uneven flow of people, which is collective inequality (Mauro, Minici and Pappalardo, 2025), and may affect the development of the tourism industry of different regions. Although this kind of uneven distribution of resources due to the algorithmic recommendation mechanism is already common in other apps, as the functionality of AI travel planner apps tends to recommend and customise itineraries to users in a 'precise' way, rather than the traditional way of allowing users to search and discover on their own. The convenience and speed of AI actually expose users to fewer choices, which means the power of algorithmic recommendations becomes greater.

Our observation that AI travel planning apps are fairly underdeveloped extends to other concerns. These are unsatisfactory interface designs and functionality, as well as an abundance of commercial elements such as subscription models, commission-based partnerships, and in-app advertising that function as sub-channels for larger travel companies. These elements typically promote large travel companies, raising the question of whether such apps act primarily as sub-channels for business partners rather than

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user-centred travel tools. The power of the platform is not entirely concentrated in the platform itself, but is decentralised and mediated through the relationship network with partners. These partners offer assistance in data sharing and service provision, enabling the platform's influence to expand into a wider range of fields (Van der Vlist and Helmond, 2021, p. 4). However, more internal data analysis is needed to substantiate this claim of underlying business logic.

AI as a Conduit of Infrastructural Power

Beyond individual affordances, these apps also embed themselves and expand their reach within broader platform ecosystems. The deployment of large language models, such as OpenAI's ChatGPT, integrated via APIs, dynamic URLs, and user-generated content tools, serves as a mechanism to consolidate platform power. Emerging apps Mindtrip and Romie exemplify this ongoing evolution and the industrialisation of AI, reflecting an ambition to integrate multiple services and functions into niche 'all-in-one' apps. Though these aspirational apps do not emulate super apps in the traditional sense, their focused, sector-specific approach carries traces of this logic that could be described as super app-like (Van der Vlist et al., 2024b).

By leveraging B2B partnerships, embedding the infrastructures of large AI providers, and enlisting users as contributors to promotional content, these platforms position themselves as mediators within complex partnership ecosystems, centralising control and mediating interactions between users, businesses, and third-party services. In doing so, they establish themselves as central nodes in the broader audience economy, where data and data audiences are circulated and monetised. Paradoxically, users are encouraged to engage in micro-entrepreneurial-like activity to monetise their content, giving the appearance of agency, while simultaneously being commodified and exchanged within the platform's ecosystem. In this way, users-turned-creators become central to the platform's value creation and are encouraged to engage in the proliferation of content, thereby enacting a logic wherein the monetiser becomes the monetised.

The high-value and data-rich nature of travel consumption makes the travel sector particularly attractive to companies like Mindtrip Inc. and Expedia Group, who drive platformisation, the AI-fication of travel, and mediate power through infrastructural and strategic control, shaping who gets access, when, and how. AI integrated through APIs and dynamic URLs thus plays a key role in further entrenching the infrastructures and

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strengthening the power of these platforms, which, in turn, facilitates the broader expansion of AI ecosystems. At the same time, the reliance of travel apps and their associated platforms on OpenAI's models and infrastructure creates layered dependencies. The relationship between platforms like Expedia and Mindtrip, as well as AI companies like OpenAI and Big Tech, thus resembles a Russian doll effect, with each player depending on the one beneath it. Smaller companies rely on AI models and APIs from larger platforms, which in turn depend on the AI infrastructure provided by initiatives like OpenAI. Meanwhile, OpenAI, as noted by Van der Vlist et al. (2024a, p. 5), relies on Big Tech—particularly Microsoft—for support and investment.

Conclusion

This study took place in the context of a data sprint tied to the UvA course *Appification: The Cultures and Economies of Apps*, which explored the theme of appification in the age of AI. Altogether, this paper presented a mapping of the current landscape of AI travel planning applications and investigated the framing of their AI implementations. To do this, we were guided by the following question: *How do AI-driven travel planning apps frame and implement AI, and what do these framings reveal about the appification of travel within platform economies?* By conducting an app store analysis and multiple walkthroughs, we examined eight representative applications to understand how they present AI and how users interact with these technologies. In addition, we examined two emerging initiatives to investigate how AI is used in the context of B2B partnerships and the creator economy.

Many AI travel applications currently concentrate their efforts on the early phases of trip organisation, such as choosing destinations or planning routes. However, there are many limited areas, like navigation support for public transit systems or adjusting to sudden schedule changes during the actual travel process. This situation demonstrates that the concept of "smart travel" remains incomplete in its current form, not fully covering the complete travel experience. The majority of intelligent functionalities in these applications exist primarily during the preparation phase, whereas the operational stage still shows considerable potential for advancement.

Meanwhile, aspirational AI-powered travel apps Romie and Mindtrip position themselves as central nodes within fragmented market ecosystems in the travel industry. By leveraging infrastructures, consolidating services, forging partnerships, and integrating with third-party applications, these platforms consolidate roles that traditionally would have been distributed across multiple industry actors, such as travel agencies, tour operators, content creators, and service providers. By strategically leveraging techno-material elements, such as APIs and AI infrastructure, they collect and operationalise data from both consumers and partners, allowing for the orchestration of semi-closed yet highly interconnected platform ecosystems. At the same time, the use of artificial intelligence in travel apps generates new interdependencies, as AI-powered features rely on models and infrastructure from initiatives like OpenAI that, in turn, are driven by Big Tech's infrastructural support and investment (Van der Vlist et al., 2024a, p 5).

It is important to recognise the constraints of this methodology. Our investigation has focused primarily on observing and analysing elements like app appearance, functions, and the language used, as well as guiding users through pathways. The study particularly explores how these applications build up their 'intelligent' characteristics and shape user perceptions through interface pathways. However, this approach mainly captures the pre-designed aspects of user interaction within applications, rather than showing actual user responses and behaviours. For example, we remain unable to determine whether travellers genuinely rely on AI-generated suggestions, feel content with customised travel plans, or regularly utilise these digital tools while navigating unfamiliar locations. Future investigations could enhance understanding of user perspectives and attitudes by adopting this framework and incorporating techniques like detailed interviews and survey distributions, which would help monitor emotional responses and decision-making patterns when people interact with AI travel apps. As these apps and their associated platforms continue to develop, they may come to reshape how travel is imagined and organised, transforming how we explore and move through unfamiliar spaces.

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