Fernando van der Vlist · Esther Weltevrede
(Editors)

The Nationality of Apps

Exploring National App Cultures and Economies

ASI Sprint Report
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app studies initiative

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Contents

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 first ASI Sprint Report stems from the 2023–2024 Master's elective course 'Appification: The Cultures and Economies of Apps', taught 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 course during its 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

The Nationality of Apps?

Fernando van der Vlist · Esther Weltevrede

Abstract

As Apple's App Store approaches its 16th anniversary, regulations, markets, and services have evolved into local offerings of what was once a unified marketplace, resulting in distinct app experiences worldwide. In the context of ongoing efforts to regulate the app ecosystem, dominant app stores like Apple's App Store and the Google Play Store play a pivotal role in delineating and controlling boundaries between countries or regions within it. This report explores the implications of this trend for country-specific offerings and regional cultures and economies of apps, as well as the diverse manifestations of 'appification' on a global scale. Through a series of diverse case studies conducted together with our Master's students, adopting a 'multi-situated' approach to app studies, it highlights the multifaceted impact of apps on everyday life, cultural and economic dynamics, and geopolitical events. Ultimately, the report underscores the importance of critical app studies and its ongoing relevance in comprehending the cultural, economic, and political dimensions of mobile apps and appification across countries and regions worldwide.

Keywords: appification · app studies · app stores · mobile apps · national app cultures · data-sprinting

Referenced Actors: AltStore PAL · Android · App Studies Initiative · Apple · App Store · Bridgefy · Data.ai · Douyin · Digital Methods Summer and Winter Schools · Facebook · Google · Google Play Store · Google Search · mobivention App marketplace · Sensor Tower · Signal · SpaceX · Starlink · Telegram · TikTok · University of Amsterdam · WeChat · Zello

Introduction: Fragmenting Cultures and Economies of Apps

In July 2024, Apple's App Store will celebrate its 16th anniversary—a significant milestone in the political economy of software cultures (Dieter et al., 2019). Since its inception, the App Store has not only housed official or 'first-party' applications developed by Apple but also apps created by third-party developers. Following suit, Google launched the Android Market, later rebranded as the Google Play Store, on October 22, 2008, offering a platform for apps compatible with the Android operating system. Unlike the Web, initially conceived as a shared information space before being commodified, apps were conceptualised as informational commodities right from the start (Dieter et al., 2019; Morris and Elkins, 2015).

Today, apps are the dominant media form. Mobile apps have emerged as cultural and economic entities, deeply embedded in our everyday lives. This is recognised in the critical literature discussing apps, their infrastructures, and the 'appification' of everyday life. These studies underscore how apps fundamentally transform how we communicate, access information, make payments, and use digital services (Dieter et al., 2019; Gerlitz et al., 2019; Goggin, 2021; Miller and Matviyenko, 2014; Pybus and Coté, 2021; Morris and Murray, 2018; Steinberg et al., 2022). In 2022, global app downloads reached 255 billion, as reported by the app analytics company Data.ai, with users spending an average of 5 hours on their mobile devices daily. Furthermore, consumers spent a staggering $167 billion in app stores. These statistics similarly underscore the profound integration of mobile devices into our daily lives, routines, and various industries, indicating a significant shift in media production and consumption towards mobile platforms. Industries such as finance, health and fitness, dating, sports, media, and food and restaurants are undergoing a transformation, increasingly becoming 'appified' (Morris and Murray, 2018).

Since its launch in 2008, Apple has upheld the App Store's operations uniformly across 175 countries, which includes its imposition of a 30 percent commission on each app sold. Apple touts this strategy as an economic success story, citing the store's contribution to generating over $1 trillion in sales, facilitating the creation of more than seven million jobs, and yielding billions of dollars in annual profits for the company. Nonetheless, as the App Store approaches its 16th anniversary, the implementation of divergent regulations has fragmented what was once a unified marketplace, resulting in distinct regulatory environments across numerous countries and regions worldwide (Mickle, 2024).

Amid ongoing efforts to regulate the digital environment, exemplified by recent initiatives such as the European Union's Digital Services Act (DSA) and Digital Markets Act (DMA), dominant app stores have taken on a crucial role in delineating and controlling boundaries

between countries and regions with regards to apps. In April 2024, one month after Apple's 'begrudging capitulation' to the DMA, there was one alternative, third-party iOS app store available in Europe, with several other alternative stores announced. These include stores such as Epic's Games Store, MacPaw's Setapp iOS store (Booth, 2024; Roth, 2024a; Roth, 2024b), the AltStore PAL ('Sideloading for Everyone—Discover apps that push the boundaries of iOS'), exclusively available in the EU at €1.50 per year, and the B2B-focused mobivention App marketplace.

Regarding compliance with another European Union regulation, the EU General Data Protection Regulation (GDPR), Krämer (2024) finds that Apple's App Store and the Google Play Store 'distort the compliance of apps with data protection laws' through their implementation of privacy labels alongside privacy policies. According to Krämer, 'The design of the labels favours disclosures of developers that offer a variety of apps that can process data across different services and contradictory disclosures do not get flagged nor verified by app stores'.

Driven by these developments, the influence of dominant app stores extends to shaping the global cultures and economies of apps, acting as the primary 'entry point' for app distribution, monetisation, and exploration by users (Dieter et al., 2019). Consequently, this ASI report explores the implications for country-specific, or regional, cultures and economies of apps, as well as the diverse manifestations of apps and appification worldwide, and examines how critical app studies research can enrich our understanding of these geographic and regulatory dynamics.

On the Nationalities of Issues and Apps

These dynamics echo trends observed on the Web and in the field of Internet studies, where the term 'national web' encapsulates the shift of the Internet from the concept of 'cyberspace,' which evokes a placeless realm of email and data packets, to a web characterised by distinct national domains (.de, .fr, .gr, etc.) and websites tailored to a user's location through their content, advertisements, and language (Rogers et al., 2012). Moreover, Google Search began providing localised user experiences and interfaces for specific countries or regions in the mid-2000s and Facebook offered hyperlocal online targeting capabilities through its array of digital marketing and advertising tools, products, and services in the 2010s (Helmond et al., 2019). As such, the introduction of local Google Search brought to fruition 'search as research' (Rogers, 2013), a technique employed for comparative online issue analysis. This approach allowed for the examination of the 'nationality of issues', such as the study of hierarchies of rights-types per country using local Google Search results pages (DMI, 2016). Similarly, the

widespread use of online advertising and targeting capabilities has enabled new forms of online 'controversy mapping' (Coromina et al., 2023), as well as critical analysis of (country-specific) online tracking technologies (Helmond et al., 2013; Helmond et al., 2015), cross-border data 'flows' (Van der Vlist and Helmond, 2021), and data-sharing regimes (Van der Vlist et al., 2022).

Due to their influence in the mobile ecosystem, app stores have become powerful cultural and economic *shapers* (Dieter et al., 2019; Van der Vlist, 2022). At present, the app stores are driving a new wave of 'nationalisation' within the mobile ecosystem, which includes apps and platforms designed for smartphones, tablets, wearables, cars, and other mobile devices (Van der Vlist et al., forthcoming). Taking cue from a rich tradition of 'digital methods'-style research originating at the University of Amsterdam (Rogers, 2013), these developments should not solely be viewed as challenges but also explored as potential avenues for exploring what may be termed the 'nationality of apps', alongside their global cultural and economic dimensions.

Existing ASI research has engaged in comparative analysis of app ecosystems, rankings across countries or regions within the store, or comparisons across multiple stores (Dieter et al., 2019; Van der Vlist et al., forthcoming). In the early months following the outbreak of the global coronavirus (COVID-19) pandemic in 2020, Apple and Google emerged as central 'gatekeepers' in the discussion regarding the role of apps in (sovereign) countries' responses to the pandemic. Depending on their country of residence, users would be presented with a different selection of app search results that were editorially curated by Apple and Google, together with local governments, health authorities, and other organisations. Using a methodological workaround, ASI researchers managed to survey the global landscape of COVID-19 apps, representing the first global analysis of its kind (Dieter et al., 2021). They analysed the functionality of individual apps, examined the organisations responsible for them, and examined their infrastructural features. This highlighted the diverse responses observed worldwide, ranging from countries like Germany and the Netherlands providing only a few government-made apps (e.g., for digital contact-tracing and proof of vaccination) to others, such as India, offering dozens of apps developed by various organisations. Moreover, they critically analysed the roles of Apple and Google in governing their COVID-19 app ecosystems during the pandemic.

Another ASI landscape study examined the global presence of 'super apps'. These apps, exemplified by WeChat, are 'characterised by a wide range of seemingly unrelated services built onto a core functionality, creating an immersive and unified experience for everyday activities that resembles both an operating system and brand' (Van der Vlist et al., 2024: 2; cf. Steinberg, et al., 2022). In addition to categorising various types of super apps, the authors

conducted an in-depth analysis of individual app functionalities, their diverse target markets or industries, the companies responsible for their development, their historical trajectories, and their geographic attributes. This includes strategies for international expansion and cross-border operations. As super apps expand or operate across borders, 'they must navigate diverse cultural norms, local regulations and infrastructural variances, leading to distinct geographic profiles and tailored corporate strategies' (Van der Vlist et al., 2024: 16). Once again, the authors underscore the roles of Apple and Google in shaping the ascent of super apps and governing access to them through local availability restrictions imposed in various countries and regions worldwide.

Moreover, related studies have emphasised that the evolution of (super) apps is significantly influenced by regional contexts (Jia and Kenney, 2022; Jia and Ruan, 2020; Kaye et al., 2021; Pitre, 2022; Steinberg et al., 2022). To comply with local regulations and meet infrastructure requirements for their operations across countries or regions, app developers and development companies employ various strategies. These include implementing geoblocking to restrict the app's distribution through app stores, 'muting' or adjusting certain functionalities, and distributing parallel local app versions (as with Douyin/TikTok's parallel app versions for Chinese and international users, for instance).

Additionally, global dynamics are often reflected in the app store. The Russian invasion of Ukraine on February 24, 2022, sparked an immediate surge in the popularity of VPNs and light US social media apps in Russia. This surge is evident from the increased download counts and the subsequent prominence of these apps in the national app store top charts. Additionally, Ukrainians turned to offline mapping and encrypted communication apps, such as Signal, Telegram, and offline messengers Zello and Bridgefy (Perez, 2022a). Downloads of Elon Musk's (SpaceX) Starlink app surged in Ukraine, making it the most-downloaded free app on certain days (Tan, 2022).

Meanwhile, the Russian app stores experienced a significant loss of thousands of apps following the invasion, although several Big Tech apps remained and maintained high rankings (Perez, 2022b). Notably, these shifts were not only observed through app market data from companies like Sensor Tower but also reflected in the national app store top charts. This trend was not confined to Ukraine alone but also extended to neighbouring countries affected by the conflict or with a significant Ukrainian diaspora.

Once again, these shifts in app usage underscore the integral role that apps play in everyday life around the globe. This highlights the importance of research into the cultures and economies of apps, as well as the use of apps and app stores, within this research, employing their 'native' affordances and material traces (Dieter et al., 2019; Helmond and Van

der Vlist, 2021).

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 25–28, 2024. 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.

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 25–28, 2024. 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 inquiry in this dynamic and complex field.

Overview of the Chapters

This report comprises three original research contributions, each exploring national or fragmenting app cultures and economies. The chapters are organised from broader, general themes to more specific, focused studies to provide a coherent narrative. This structure allows readers to first grasp overarching trends and cultural dynamics before examining specific app categories. Note that these contributions are part of a larger collection of research reports originating from the Spring Data Sprint, not all of which were included in this publication.

In Chapter 2, 'Transnational Gaming Flows: A Study of Mobile Game Import/Export Patterns and Genre Preferences Across Asian and Western Markets', **Shiyun Qian**, **Lingyun Yue**, and **Yuhe Ma** examine the cultural dynamics and globalisation of digital entertainment through mobile gaming. This study analyses the top-100 downloaded mobile games in ten Western and Asian countries, revealing each nation's gaming preferences and the cultural motivations behind them. The authors explore how the COVID-19 pandemic has accelerated mobile gaming's rise, surpassing music and films as a central aspect of youth culture. The research fills a gap in mobile gaming studies by critically discussing traditional views on cultural invasion and highlighting how mobile games reflect and influence cultural exchange and globalisation trends.

In Chapter 3, 'Exploring Cross-National Work Cultures: A Study of Job Apps Across Six National App Stores', **Federico Lavatori** analyses the differences in job-related apps across six national app stores. The study focuses on apps linked to the workplace, aiming to understand the heterogeneous landscape through the lens of cultural norms and socioeconomic issues. Lavatori's findings indicate that domestic App Stores in countries like China, Japan, and Russia feature numerous work-related apps tailored to regional needs, while in the US, globally-scaled job-centric platforms dominate. By combining app descriptions with qualitative coding and cultural dimensions, the research uncovers cross-national differences and similarities in communication styles, data privacy, security, and employment flexibility, providing a comprehensive view of the app-based work environment.

In Chapter 4, 'National Health and Fitness App Cultures: An Analysis Across American, Asian, and European App Stores', **Winnie Lee**, **Laura Dea Vamper**, and **Cong Hung Đinh** investigate the reflection of local health cultures in national health and fitness apps. The research focuses on the top health and fitness apps in eleven countries, analysing their content, functions, and services. By investigating how these apps are tailored to align with local health needs and practices, the study underscores the regional disparities in health focus areas across Asia, America, and Europe. The authors also investigate the revenue models of these apps, highlighting how developers generate income through subscriptions and in-app purchases, which offer exclusive benefits to local users. This research underscores the importance of cultural adaptation in app development, illustrating how national factors influence the operation and success of health and fitness apps in various regions.

Overall, these contributions document the national specificity and cultural differences in app cultures and economies as reflected in dominant app stores. They provide evidence of how apps are influenced by and adapt to local cultural norms, socioeconomic conditions, and user preferences. This collection of studies highlights the importance of considering national contexts in the development and deployment of digital platforms.

Acknowledgements

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2

Transnational Gaming Flows

A Study of Mobile Game Import/Export Patterns and Genre Preferences Across Asian and Western Markets

Shiyun Qian · Lingyun Yue · Yuhe Ma

Abstract

In the wake of the COVID-19 pandemic, mobile gaming has experienced a rapid surge, eclipsing music and films to become a central element of youth culture. This study scrutinises the top 100 downloaded mobile game applications across ten Western and Asian nations, aiming to unravel the cultural dynamics and globalisation of digital entertainment. Employing an empirical approach to app ecosystem analysis, the research reveals each country's gaming preferences and the underlying cultural motivations. By addressing a gap in mobile gaming research, this paper critically assesses conventional perspectives on cultural intrusion.

Keywords: mobile apps · national app stores · national gaming cultures · game studies · globalisation

Key Points and Findings

- The Western cultural influence in Asia has transformed into a bidirectional process, necessitating increased vigilance concerning cultural exchanges within and between Asian and Western nations.
- Japan and South Korea exhibit a more pronounced 'feminine' cultural temperament in gaming, while India and Indonesia demonstrate 'masculine' gaming cultures akin to those in Western countries. In contrast, the Chinese market showcases preferences for both 'feminine' and 'masculine' games.

Introduction

> 'Video games have replaced movies and music as the most important aspect of youth culture.'

This was the comment made by Sean Monahan in the Guardian's opinion column when he learned that the gaming industry's revenue ($139 billion per year) had outstripped the NFL, NBA, MLB, and NHL combined (Adweek, 2020). In recent years, particularly in the wake of the COVID-19 pandemic, online games have replaced music and films as the key to emerging social scenes, rapidly rising to the top and becoming the most important part of popular culture (Monahan, 2021). According to Market Watch (2021), the global gaming industry is expected to generate revenue of $180 billion in 2020, with revenue growth of 20%, surpassing the sports and film industries worldwide.

As a prominent cultural phenomenon that captivates millions of players around the world and influences various aspects of contemporary society, many scholars have conducted research on video games. For instance, Aslinger and Huntemann (2013) argued that video games are an eminent example of cultural globalisation due to their transnational nature. Similarly, Kerr (2006) also considered video games as a 'global cultural industry,' where gaming culture is inherently asymmetrical and gaming dynamics are only controlled by a few corporations based in developed countries (e.g., the US and Japan). Moreover, other topics related to video games included user consumption (Šisler et al., 2017), gender (Cassell & Jenkins, 2000), platformisation in game development (Nieborg et al., 2020), globalisation and localisation of gaming culture (Aslinger & Huntemann, 2013; Šisler et al., 2017), and the transnational flows of gaming cultures (Hjorth & Chan, 2009).

However, compared to the abundance of video game research, there is a distinct relative paucity of research on mobile games. In the existing literature, there are only limited studies on regional mobile game markets (e.g., South Korea, Japan, Canada), behaviours and motivations of mobile players (Cai et al., 2022), and the political economy of game apps (Nieborg et al., 2020; Nieborg, 2020), which is not consistent with the rapid development of the mobile game market. Since 2018, mobile games have become the largest subcategory in the global online game industry, and the revenue share from traditional video games has decreased from 63% to 49% (Cai et al., 2022). Especially during the COVID-19 pandemic, people have turned to mobile gaming more for entertainment (such as hypercasual, puzzle, and match games) as they are confined at home (Fakazlı, 2020). Therefore, we use mobile games as a starting point to explore the cultural dynamics, transnationality, localization and globalisation of online gaming culture.

According to Chen (2013a), a positive correlation exists between game-playing behaviour and the identification of national culture. Online games can help spread cultural influence and promote nation-building. Although digital entertainment originated in the Western market, it developed its own characteristics after being introduced to non-Western markets (Chen, 2013b). For instance, different from the male-dominated Western market, the Asian gaming market has more diversified genres, which has led to a rise in the number of young female and child gamers (Chen, 2013b). Furthermore, there have also been notable differences in the consumption tastes of the Asian and Western markets. In Asian countries such as China, Japan and Korea, the top-3 most popular genres are RPGs, Fighting/action and Cute MMORPGs (Liu & Chou, 2008). In Western countries such as the US and Canada, the top-3 genres are Sports, Action/adventure and Puzzle-solving (Chen, 2013b).

Chen believes this discrepancy is because Asian and Western gaming worlds are formed around different ideals, values and cultures. Rather than relying on technology to increase the market base in the West, Asian-style cute games have evolved with socio-cultural factors that are based on the preferences of Asian players (Chen, 2013b, pp. 1024–1025). Thus, in light of these kinds of differences between Western and Asian gaming cultures, we further investigate the cultural flows between Asian and Western gaming cultures. What are the similarities and differences between Western and Asian games? What kinds of games are imported and exported? How do their national cultures influence each other? Therefore, the following research question is framed: *What do the ecosystems of Top ranking gaming applications from Western and Asian gaming markets reveal about the underlying cultural dynamics and globalisation of digital entertainment?*

To answer this research question, we plan to conduct an empirical analysis of the app ecosystem (Van der Vlist et al., forthcoming). Based on the revenue generated by nation-states by year in the App Store top-100 (Nieborg et al., 2020), we selected five Asian countries (China, Japan, South Korea, Indonesia, and India) and five Western countries (the United States, the United Kingdom, Canada, Finland, and the Netherlands). Among these countries, India and Indonesia are in the top-3 mobile gaming markets by app store downloads, and the other eight countries are all in the top-10 revenue capture.

Literature Review

Studies of mobile game apps can be dated back to the 2010s (Chen, 2013a). Previous studies usually focus on the behaviours and motivations of players (Cai et al., 2022) or the relationship between personality and mobile gaming (Seok & DaCosta, 2015). Much of the research work in recent years has gone beyond this perspective to comprehend the intricate relationships between players and their use of mobile games (Chen, 2013a). According to Richardson et al. (2021a), the emergence of mobile gaming has brought about a 'casual revolution,' with games and other forms of playful media now 'reflecting and transforming the complex practices and relationships that structure contemporary life' (Richardson et al., 2021a, p. 3).

In this context, mobile media devices such as tablets and phones have clearly become an important space for a broader range of gaming and fun social activities. It provided players and game designers with more flexibility and innovation in terms of game genres, gameplay, and the aesthetics and affordances of gaming environments (Richardson et al., 2021a, p. 2). Moreover, due to the diversity of mobile game genres, players can no longer be classified as 'casual' or 'hardcore' as in the past. As Consalvo stated in his paper, the pervasive integration of gaming activities into our daily lives means that mobile gamers 'defy categorization,' demonstrating the need to move beyond traditional categorizations of gaming (Consalvo, 2012b, p. 193).

Another study conducted by Nieborg and his colleagues (2020) discussed the political economy of the Canadian App Store. Combining theories of cultural imperialism and platform capitalism, they explored whether Canadian mobile game app developers are able to effectively generate revenue within their own national app store. However, as a complex ecosystem of markets, infrastructures, and governance models, the results showed that the Canadian game industry remains an outsourcing hub and operates as a 'net-exporter,' with studios earning the majority of their revenue from foreign sales of content under the aegis of

transnational publishers (Nieborg et al., 2020). Although Canada itself has a very vibrant game development ecosystem, given its close relationship with the United States, the United States still dominates the Canadian mobile market, which is a manifestation of economic inequality and imperialism.

Similarly, Chen's paper (2013) also uses the impact of Japanese gaming culture on Asia as an example to explore the theories of cultural imperialism and globalisation. Initially, cultural imperialism assumed a one-way flow of global media (e.g., from the US to Asia). However, Straubhaar (1991, as cited in Chen, 2013) argued that cultural flows in the global economy are not only one-way but that audiences tend to choose games/programmes due to 'culture proximity.' This corresponds to Taiwan's fascination with Japanese popular culture, and Japan's dominance of the global games market (Chen, 2013). Additionally, another paper by Jin (2011) investigated how Korean popular culture—especially online games—expanded its influence to Western cultural markets, including the United States and Europe. This work advanced the idea of contra-flow, representing the cultural flow from non-Western to Western countries. These texts provide a theoretical framework for our research, which will help us discuss the gaming flow and contra-flow between Asian and Western countries.

Last but not least, Van der Vlist and his colleagues' paper (forthcoming) provided the methodological framework for our study. In this paper, they propose approaches to the empirical study of mobile app 'ecosystems,' referring to the 'complex network of relations between apps, platforms, developers, and other interrelated components' (Van der Vlist, forthcoming). We can systematically use these approaches to study the culture and economy of Western and Asian mobile game apps, as well as reflect on how the culture and economy of these apps are affected by various platform interventions.

Method

As mentioned in the literature review, to move forward with the empirical study of what are called the 'ecosystems' of apps, we utilised the empirical approach to app ecosystem analysis created by Van der Vlist et al. (forthcoming). Recognizing that 'app stores reflect larger social and cultural phenomena and dynamics' (Van der Vlist et al., forthcoming), we opt to use the app stores as entry points, examining the ecosystems of gaming apps in both Asian and Western markets. Considering that some applications in the Apple App Store and Google Play Store may not be compatible, we decided to reference the rankings of both app stores simultaneously. To achieve this, we refer to the research methodology of Winestock & Jeong

(2014) and, like them, employ Data.ai (formerly known as App Annie) to obtain statistical data and performance information about game apps.

We utilised Data.ai to filter out the top-100 game apps with the highest download rates between January 1st and March 25th, 2024, across all application stores in ten target countries. This resulted in a total of 1,000 data entries. Subsequently, we created gaming app collections and employed the web data scraping tool Bazhuayu to capture icons, country information, as well as the application category and subgenre for all apps within the collection.

It is worth noting that the app IDs of certain apps have been changed, and some individual applications have been removed from the app stores, resulting in missing data in Data.ai. Despite our manual search and supplementation efforts, there are still a very small number of apps for which complete relevant information could not be obtained, leading us to exclude them from our final dataset. Despite certain data imperfections, the vast scale of our database ensures that its impact on our final results is small.

Based on the dataset, we generated an alluvial diagram through Raw Graph 2.0, illustrating the relationship between the developer and target countries of mobile gaming apps. We also created a tree map to visually represent the distribution of game categories across different target countries, manually adding icons for all apps. For further elucidation, we utilised Excel's charting tools to depict the proportion of different developers' countries in the ten target countries and the distribution of subgenres within the most popular categories across the ten target countries.

Analysis

We understand the ecosystems through two main factors: the developer's country and the game genre. The import and export of mobile games reveal the economic exchanges and relationships between different mobile game markets, while the game genres shed light on gaming cultures and user preferences. These perspectives are also interrelated, reflecting distinctive app ecosystems in different parts of the world. According to our findings, these ecosystems cannot be viewed as separate; rather, they influence each other through constant exchanges.

The top-100 mobile games in the five Asian countries (China, India, Indonesia, Japan, and South Korea) are from 25 developers' countries. The top-100 games in the five Western countries (Canada, Finland, the Netherlands, the UK, and the US) are developed in 21 countries (Figure 2.1). On the whole, it appears that, compared to the Western markets, the

top-100 games in the Asian markets we investigated come from a larger pool of developers' countries. But on an individual level, that is, when we examine the top-100 mobile games in each country, we find that on average, the top-100 games in each Asian market come from 13 countries, while the average for the Western markets is 16.6. This goes to show that in terms of preference for developers' countries, the five Asian countries have more differences with each other, while the Western markets have more similar 'tastes' ; at the same time, a higher level of developer's country diversity can be observed in individual Western markets.
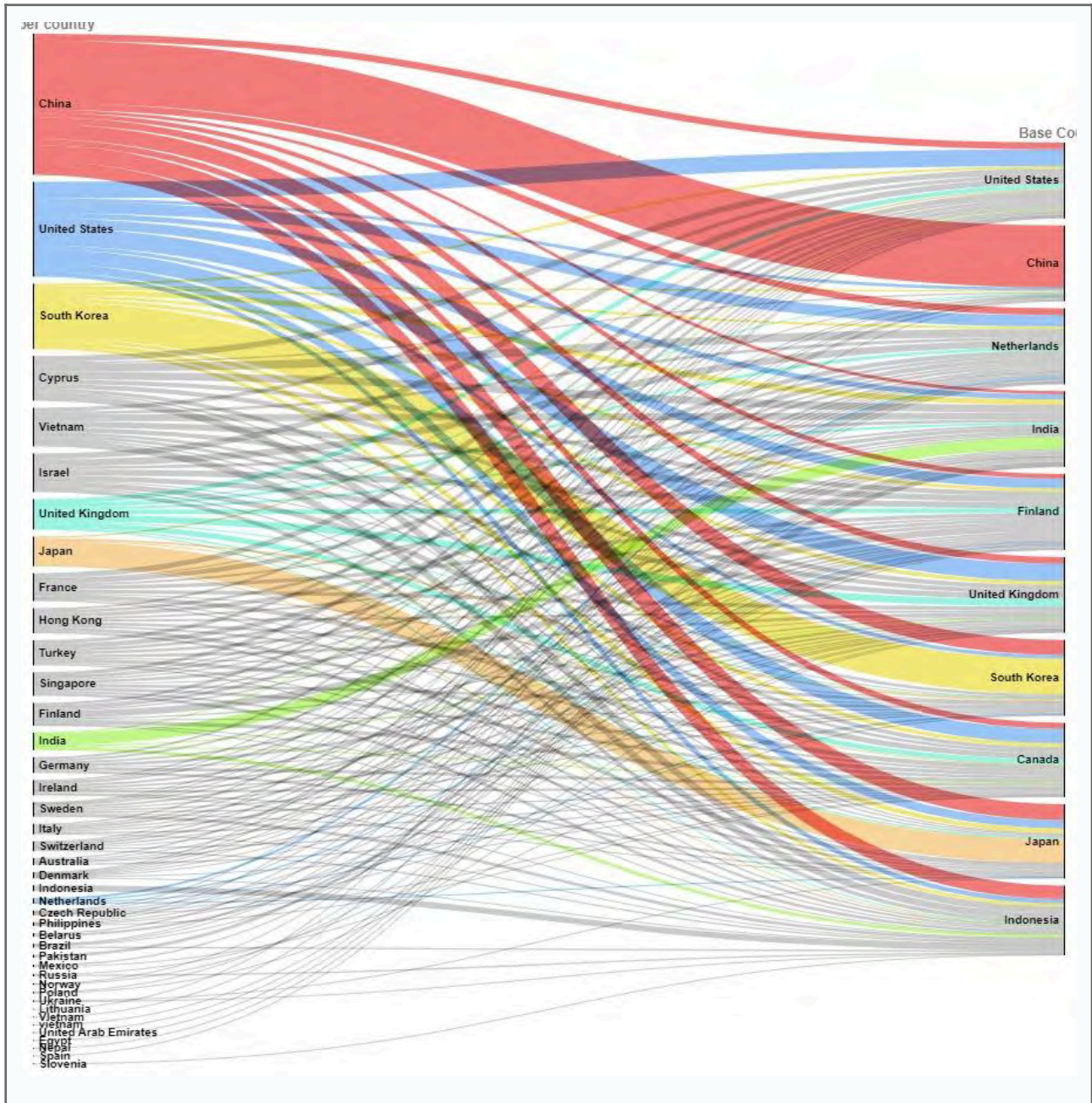

Figure 2.1. Gaming flows between base countries and target countries.

For this reason, if we visualise the distribution of developers' countries among the top-100 mobile games using pie charts (Figure 2.2), they look relatively similar at first glance for the five Western countries. One notable finding is that the US is the most dominant developer's country for all five markets. Perhaps unsurprisingly, mobile games developed by US companies are the most popular in the US, occupying 23% of the places among its top-100. But the numbers are almost as overwhelming in the UK (22%), Canada (19%), the Netherlands (15%), and Finland (13%). Such preferences for US mobile games are in drastic contrast to the preferences of Asian markets. In the five Asian countries that this study investigated, four have a predominant preference for locally developed games, with Indonesia being the only exception. A striking 82% of the top-100 mobile games in China are developed by Chinese companies, and local mobile games have 47%, 32%, and 16% presence in South Korea, Japan, and India, exceeding any other developers' countries. For Indonesia, however, more top-100 mobile games are developed in China than any other country, whereas local mobile games only have an 8% presence—significantly lower than the local games in any other Asian country, but not necessarily lower than Western markets. In Canada, none of the top-100 mobile games are developed locally, and the numbers of local top-100 mobile games are also low in Finland and the Netherlands, despite their prominent video game culture (Nieborg et al., 2020). It appears that a well-established (indie) video gaming ecosystem does not necessarily translate into mobile gaming market share.
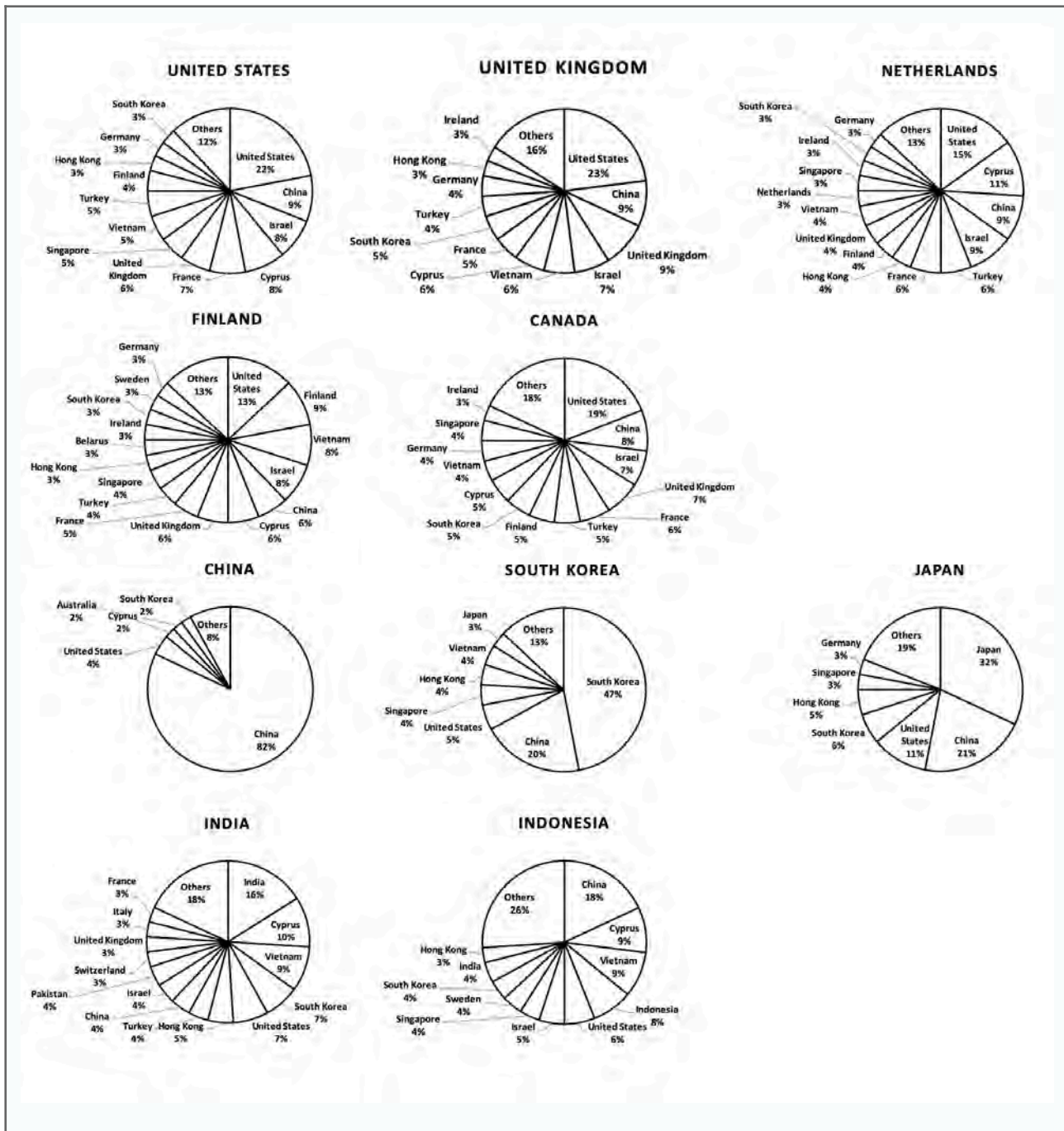
Figure 2.2. Market shares of developers' countries in ten target countries.

For the ten base countries we investigated, China, US, and South Korea are the top-3 developers' countries, followed by Cyprus and Vietnam (Figure 2.1), suggesting that the latter two would also be valuable objects of investigation concerning mobile production and especially exportation. In sum, the top-100 mobile games in Western markets are largely dominated by US developers, while Asian markets, with the exception of Indonesia, are more self-sufficient, with users showing a clear preference for locally produced games. Beside the

US, Asian and European developers are also responsible for an overwhelmingly large proportion of mobile game exports.

The Japan and South Korea markets showed the greatest similarity in gaming genre preference. (Figure 2.3) In both countries, Hyper-Casual, Role-Playing (RPG), and Match were the three most popular genres in the top-100, with a combined dominance of 57% and 61%, respectively in Japan and South Korea. Nevertheless, Hyper-Casual games enjoy the highest popularity in Japan, while South Korean users favour the RPG genre. Apart from Japan and South Korea, RPGs also enjoy dominance in the top-100 mobile games in China (22%), while Indian and Indonesian users appear to prefer Hyper-Casual, Simulation, and Action games—the top-3 genres with a combined presence of 56% and 58% in India and Indonesia, respectively. But in India, Hyper-Casual games enjoy significant predominance (27%), while the Simulation genre is preferred by Indonesian users (30%). In conclusion, findings from the genres of top-100 mobile games show a close affinity between mobile gaming culture in Japan and South Korea, while there are also certain similarities between India and Indonesia. This makes China an outlier in terms of genre preference. In the context of the five Asian countries investigated, the Chinese market appears to combine a preference for RPGs (similar to Japan and South Korea) with an interest in Simulation and Action games (similar to India and Indonesia). These three genres have the most downloads, although the three most popular genres combined only occupy 50% of the top-100, which in itself is a significant portion but less than the top-three-genre dominance among the top-100 mobile games in India, Indonesia, Japan, and South Korea.

Figure 2.3. Game genres in different target countries.

Across all five Western countries investigated, Hyper-Casual is the most popular genre, the same as in India and Japan. Meanwhile, RPGs are most popular in China, Japan, and South Korea. Upon examination of the sub-genres under the two genres (Figure 2.4), however, we are able to detect more subtle similarities and distinctions in the mobile gaming cultures of these nine countries. In the five Western countries, the most popular Hyper-Casual sub-genres are all Puzzles; in other words, Puzzle Hyper-Casual games are the most popular mobile games in these markets. This is also the case for Japan, indicating its shared interest in this specific genre of games with Western countries. In contrast, users prefer Action Hyper-Casual games more than any other Hyper-Casual games. On the other hand, RPGs are popular across China and South Korea, but there is significant division in sub-genre preference. In China, MMORPGs have the most downloads, whereas in South Korea, Idle RPGs lead the chart by a large margin (61.4%). It is worth noting that RPGs are almost as popular as Hyper-Casual games in Japan, suggesting a general overlap in genre preference between the three countries of China, Japan, and South Korea.
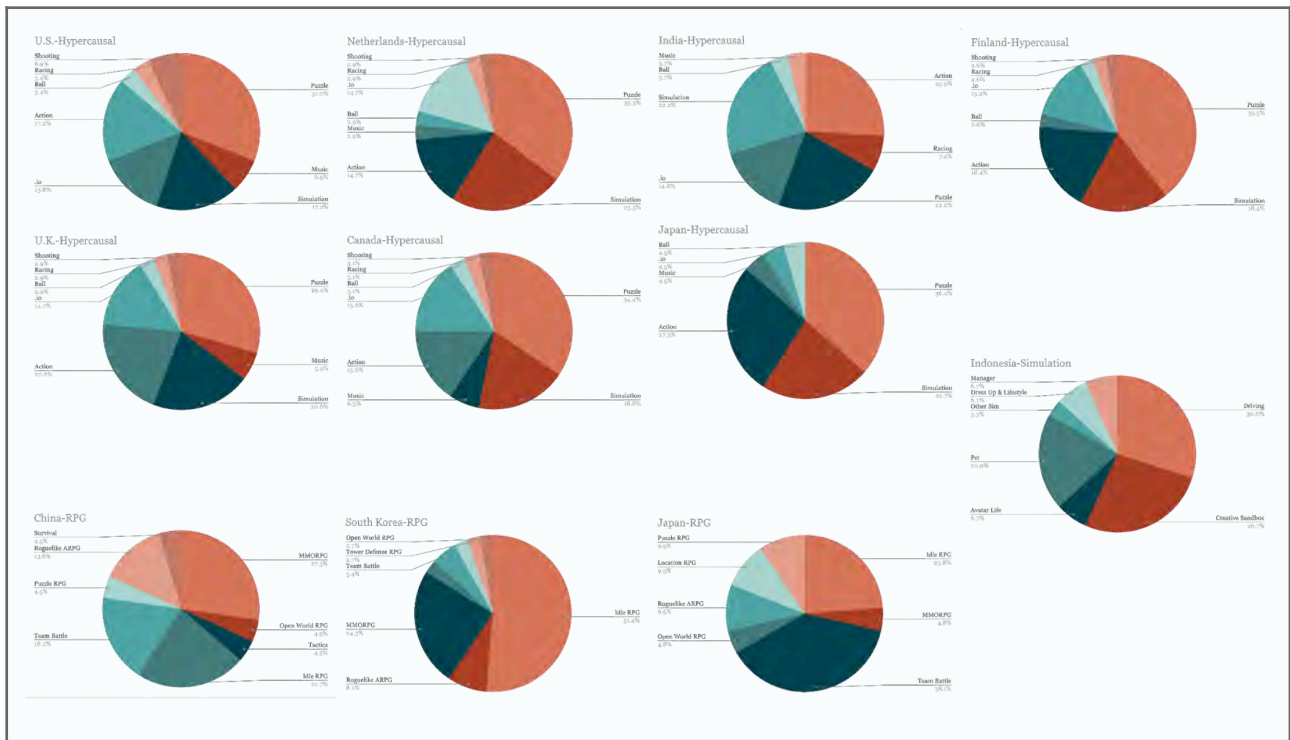
Figure 2.4. Sub-genres of the most popular category in different target countries.

Discussion

Indonesia is an outlier among the major Asian mobile game markets that we investigated. Not only are imported mobile games more popular—unlike in the other four Asian countries, where users play predominantly local games—but the most popular genres also deviate from general trends in China, India, Japan, and South Korea. Indonesia is a leading mobile game market: with a population of 274.9 million people, it has 126% mobile subscriptions with a 74% penetration among internet users, and its mobile game download number on Google Play ranks third globally as of 2024 (Ministry of Tourism and Creative Economy, Republic of Indonesia). A 2021 market review published by the Japanese agency Dentsu revealed that Multiplayer Online Battle Arena (MOBA) & FPS (First Person Shooter) were the most popular mobile game genres in Indonesia in that year, but also pointed out that mobile gaming preferences are very dynamic and result in different trends within only a few months—a proposition that is confirmed by our study. At the time of our data collection in March 2024, in Indonesia, Simulation games led the chart in downloads with an impressive 30% dominance in the top-100, followed by Hyper-Casual games, which had a 19% presence. This is an example to remind us that mobile gaming genre preference can witness dramatic shifts, especially in certain regions/markets over the years. It could be a topic worth investigating for future research.

As mentioned before, some researchers argue that Asian countries have been influenced by cultural imperialism through gaming. However, in our research, we do not see a significant cultural invasion dominated by any single country's games in most Asian countries. Instead, locally produced games have a low market share in Western countries, with games produced in the United States generally holding a significant share, leading to a homogenization of their gaming culture. This may be due to several factors: (1) the advanced game production level of individual Western countries, especially the United States; (2) the widespread use of English in Western regions; and (3) some other historical factors. As mentioned in the literature review part, most Asian countries tend to prefer locally developed games and games from the same region, while also contra-flow to Western countries. This indicates that with the increasing technological advancement in Asian countries, the Western cultural invasion of Asia has evolved into a bidirectional process. It has become a gradual, relatively peaceful cultural exchange in the context of globalisation. We prefer to refer to this phenomenon as 'cultural infiltration' between Asia and the West. According to our research, what we need to be more vigilant about is the process of cultural flow between Asian countries and Western countries. Today, this is more likely to result in the loss of the cultural values of their own countries and have a negative impact on maintaining cultural independence.

Chen believes that games led by Western countries, such as the United States, exhibit more 'masculine' characteristics (2013b), reflecting an interest in action games. On the other hand, Asian countries, led by China, Japan, and South Korea, tend to prefer playing MMORPGs, reflecting a 'feminine' or 'cute' cultural temperament. This study revises and supplements this result. We argue that this argument simplifies and generalises the gaming culture characteristics within Asian countries. We find that the 'feminine' cultural temperament mentioned by Chen is more prominent in Japan and South Korea, while India and Indonesia exhibit 'masculine' gaming cultures similar to Western countries. The Chinese market combines preferences for both RPGs and Action games. Regarding RPG games, China leans towards MMORPGs, which tend to have large-scale online player communities and interactions. Meanwhile, Idle RPGs are mainstream in Japan and South Korea, characterised by slower-paced gameplay. This reflects differences in consumer preferences even within East Asian countries due to different cultural backgrounds.

Conclusion

In summary, this study provides a brief overview of the gaming app ecosystems between the West and Asia, using the App Store as entry points. It delves into the cultural motivations

underlying this ecosystem phenomenon, addressing a gap in related research fields and offering new research perspectives to academia. Furthermore, the paper reexamines the cultural invasion between Western culture and Asian culture through gaming apps in the context of globalisation, emphasising the potential influence of gaming exports and imports between Asian and Western countries on national cultures. It also critically distinguishes and examines the 'masculine' and 'feminine' qualities encompassed within gaming culture. This research contributes to a deeper understanding of cultural differences among different countries. Given limited research resources, the study only surveyed ten countries. Future research could expand the scope of the investigation to cover more countries and regions and further explore how gaming markets facilitate cross-cultural understanding.

Data Availability

Some of the data that supports the findings of this study is available on Google Sheets at https://docs.google.com/spreadsheets/d/1LLDt_6eaMd87s1AyJexvyiPKQyAsHbIGVSGJUgaLRQk/edit?usp=sharing (top-100 mobile games in countries studied).

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3

Exploring Cross-National Work Cultures

A Study of Job Apps Across Six National App Stores

Federico Lavatori

Abstract

This report explores the nuances of six national Apple App Stores, focusing on job-related apps. It aims to show the diverse landscape of these apps by exploring cultural norms and socio-economic factors. Our study reveals that certain domestic app stores, such as those in China, Japan, and Russia, host a plethora of work-related apps primarily catering to their respective continents. Conversely, in other national app stores like the US, globally scaled job-centric platforms tailored to various contexts overshadow regional apps. Through in-depth analysis of app descriptions and qualitative coding, supplemented by cultural dimensions from Hall and Hofstede, this study uncovers cross-national variations and commonalities across three key themes: communication and tone in work-related contexts, workplace data privacy, security, and anonymity, and the interplay between employment stability and flexibility.

Keywords: job apps · national app stores · national work cultures · platformisation

Key Points and Findings

- App descriptions exhibit significant verbosity in high-context cultures like Japan, contrasting with the concise nature observed in Russia and China, which also exhibit high-context cultural traits.
- Despite China's low individualism score, concerns regarding personal privacy, anonymity, and security remain significant.
- A prevailing trend across all countries studied is the platformisation of digitally mediated service labour, often characterised by precarious employment conditions.

Introduction

While significant research effort has been dedicated so far to studying popular genres of apps such as health, dating, and gaming, little or no in-depth investigation has been performed on platforms for employment to problematise how such artefacts act as powerful cultural shapers (Burgess, 2021, p. 24) in a professional working landscape. These apps, designed to meet the needs of several parties, are incredibly complex and multi-faceted objects that help streamline both job-seeking and recruitment processes, including resume management, employee screening, assessment tools, training, networking, and many other career-driven affordances.

Yet such functionalities are not mechanical gears of abstract and de-contextualised artefacts. They do offer insights into how work is conceptualised, managed, and experienced across diverse cultural landscapes, where differences in employment laws, labour regulations, data usage, and retention can dramatically shape the design and purpose of job-seeking platforms. Studying work-centric apps across different national contexts therefore provides a fascinating lens through which to examine socio-economic and cultural differences in work patterns, practices, and attitudes. That is because cultures tend to reveal themselves when there is much at stake (Hooker, 2012), whether it is intrinsic self-fulfilment or extrinsic monetary achievement and economic survival (Gesthuizen et al., 2019).

To further investigate the aforementioned categories of apps across different national contexts, this paper addresses two main research questions: *What is the degree of heterogeneity that can be found in domestic app store instances when studying the subspace of*

highly ranked work-related apps? And, to what extent do job-oriented apps reflect national working cultures and socio-economic issues?

Literature Review

The growth of multinational companies has led to an increased cross-national interest in work-related issues, such as technological development, organisational design, structure and culture, working conditions, employability dynamics, work goals, and values (Smulders et al., 1996, p. 1291). Similarly, job searching and hiring apps, while going global and expanding their operations, must be compliant with different cultural norms, local regulations, and infrastructural variances, leading to distinct geographic versions and tailored development strategies (Van der Vlist et al., 2024, p. 16). For this reason, it is of paramount interest to study the political economy of job-centric platforms as facilitators or inhibitors of different kinds of socio-cultural diversity in domestic and global markets (Joseph et al., 2023, p. 7248).

   In these fragmented and constantly evolving conditions, regional instances of app stores not only play the role of gatekeepers and central intermediaries between work-related app producers and consumers (Van der Vlist et al., forthcoming, p. 6) but are also responsible for promoting local content and source diversity or exacerbating homogeneity and adherence to forms of cultural imperialism (Joseph et al., 2023, p. 7250).

   Professional development apps, as socio-cultural and political phenomena (Lupton, 2020, p. 2), can also be studied, drawing on the socio-material and socio-technical perspectives to unveil their micro-political and socio-cultural dimensions (Lupton, 2020, p. 10). This approach tends to reject platforms as self-contained objects on app stores and mobile devices and instead focus on the situated spatio-temporal context in which the apps are used in relationship with a complex network of human and non-human agents (Lupton, 2020, p. 11).

   On the whole, job-centric platforms are by no means simple portals and act as non-neutral intermediaries, creating asymmetric infrastructural and economic dependencies (Helmond, 2015; Srnicek, 2017) in a complex and multi-sided job market, embodying a broader process of societal and cultural platformisation (Nieborg et. al, 2018) in the working world.

Method

To explore the situatedness of work-related apps and broadly find differences between a sample of Western and non-Western countries, this study examines six domestic App Store instances in China, Japan, Spain, the Netherlands, Russia, and the United States. We selected

the former six specific national App Stores because of the familiarity of the researchers with some regions (e.g., China), the research ambition to cover at least one or two countries for each macro-region, and finally the expectation to discover findings linked to ongoing geopolitical events (e.g., the Russian invasion of Ukraine) with systemic platformised adjustments.

Given that Google Play has been inaccessible in China since 2010 due to strict censorship policies (Mamchii, 2024), we focus solely on Apple's App Store to ensure the secure collection of data across these six countries.

Figure 1. Rank of top-10 apps for each national App Store based on the order of appearance as of March 2024.

In this phase, we analyse the 'description' column, which had been translated into English using Google Translate. We conducted a qualitative content analysis by identifying and highlighting traits we deemed relevant and distinctive in identifying cultural differences. The results are summarised in Table 3.1, showcasing the Indeed app ranked 4th in Spain.

Trait	Value
Tone	Formal

Description Length	3,139
App type	Global
Job Types	Full-time, part-time, contract, freelance, and internship employment
Job Areas	Multiple industries and roles
Technologies	GPS Tracking, AI, Recommender Systems
Features and Services	Job Search, Resume Builder, Apply for a Job, Save Job, Personalized Messages, Job Information, View Searches, Create Account, Follow Companies, Receive News, Review Saved Jobs
Security, Privacy, and Anonymity Issues	For specific services and support advertising attribution, user data such as your IP address or other unique identifiers and event data related to Indeed App installations may be shared with specific users when you download or install this application
Terms of Service	By downloading this application, you agree to Indeed's Cookie Policy, Privacy Policy, and Terms of Service. You can view the above policies and terms at http://www.indeed.com/legal
Contacts	mailto:ios@indeed.com

Table 3.1. Summary of qualitative content analysis of app descriptions.

Our analysis drew upon various cultural frameworks (Hall, 1976; Hofstede, 1984) to align pre-established cultural dimensions with the identified traits. Description length, communication style, and tone of voice were aligned with Hall's (1976) dimension of 'High vs Low Context.' High-context cultures prefer implicit, indirect, and non-verbal communication, while low-context cultures rely on explicit formulations and rules.

Job security and stability were associated with 'Uncertainty Avoidance' (Hofstede, 1984) and 'Long vs Short Term Orientation' (Hofstede, 1984). We evaluated descriptors for assurances of reliability, stability, risk aversion, or risk-seeking in the types of jobs offered (e.g., full-time, part-time, freelance), as well as future benefits and sustainability versus immediate gains and instant gratification.

Personal privacy, data security, and anonymity were linked to 'Individualism vs. Collectivism' (Hofstede, 1984) and 'Motivation towards Achievement and Success (Hofstede, 1984). We looked for language emphasising individual-oriented versus community-centric benefits. For instance, apps might emphasise security features, customization, and personalization services to appeal to individualism or focus on social connectivity, cooperation, and knowledge sharing for collectivism.

This coding and matching process was instrumental in developing a comprehensive understanding of work-related apps as multi-situated socio-cultural and political artefacts (Lupton, 2020). Additionally, we supplemented this approach with tailored ethnographic and market research to address gaps in app descriptions regarding working patterns and habits across different nations.

Analysis

As a preliminary result, we aimed at identifying local and global apps using the following rule of thumb: a platform is considered 'local' if it operates on more than 90% of a single continent; otherwise, an app operating on more than one continent with a decentralised business model is therefore considered global. To create this rule-based model, we relied both on Similarweb, an app specialising in web analytics with powerful capabilities in mapping geographic traffic shares and traffic sources, and on data.ai, an app specialising in mobile market data and insights. By doing so, we found that countries such as China, Japan, and Russia feature an extensive number of local platforms whose traffic does not extend to more than one continent or macro-area, whereas the US presents a wide portfolio of global apps, as displayed in Figure 3.2. This preliminary finding will be used as a treatment variable in the following section.
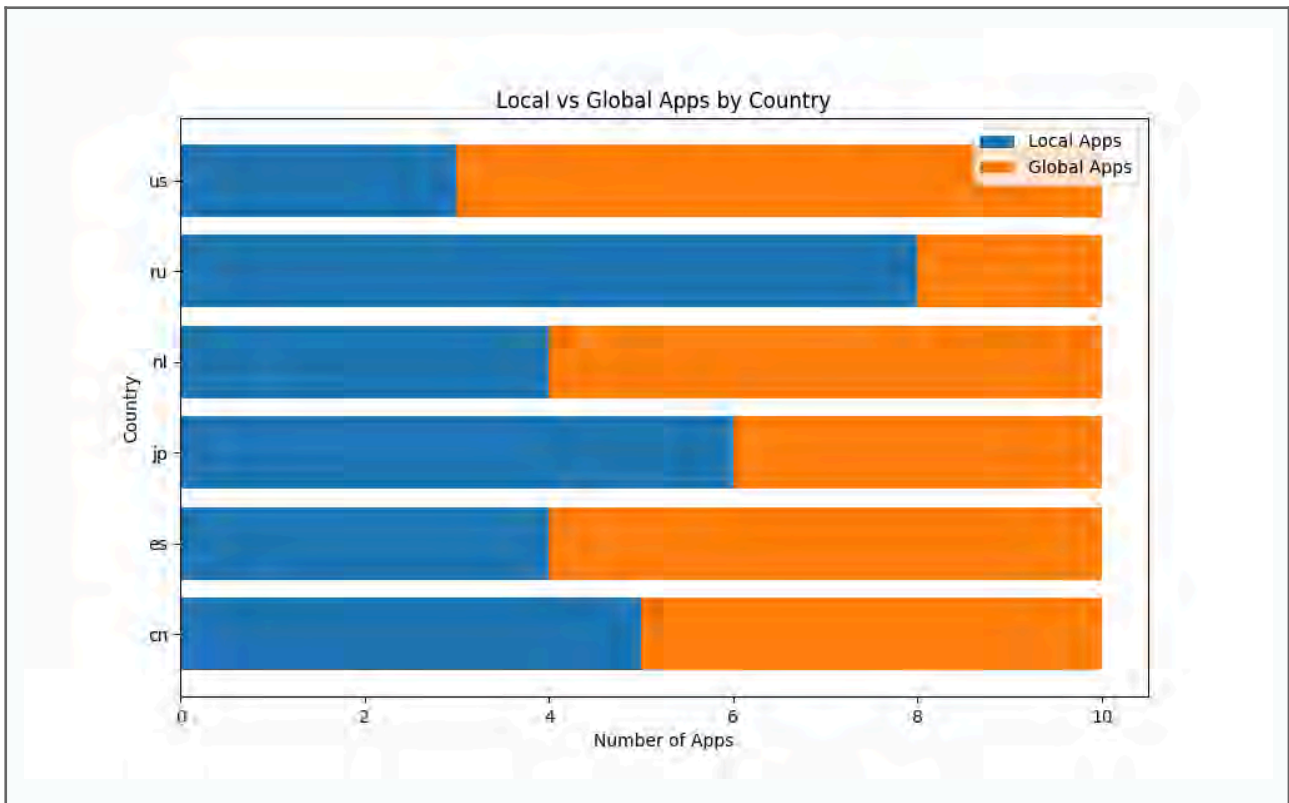
Figure 3.2. Ratio of local and global apps out of the top-10 apps for each national App Store.

Description Length, Communication Style, and Tone

The average app's description length is around 2,500 characters long, as displayed in Figure 3.3, and this value is shared by global apps across different countries, while high variability is observed for domestic apps.
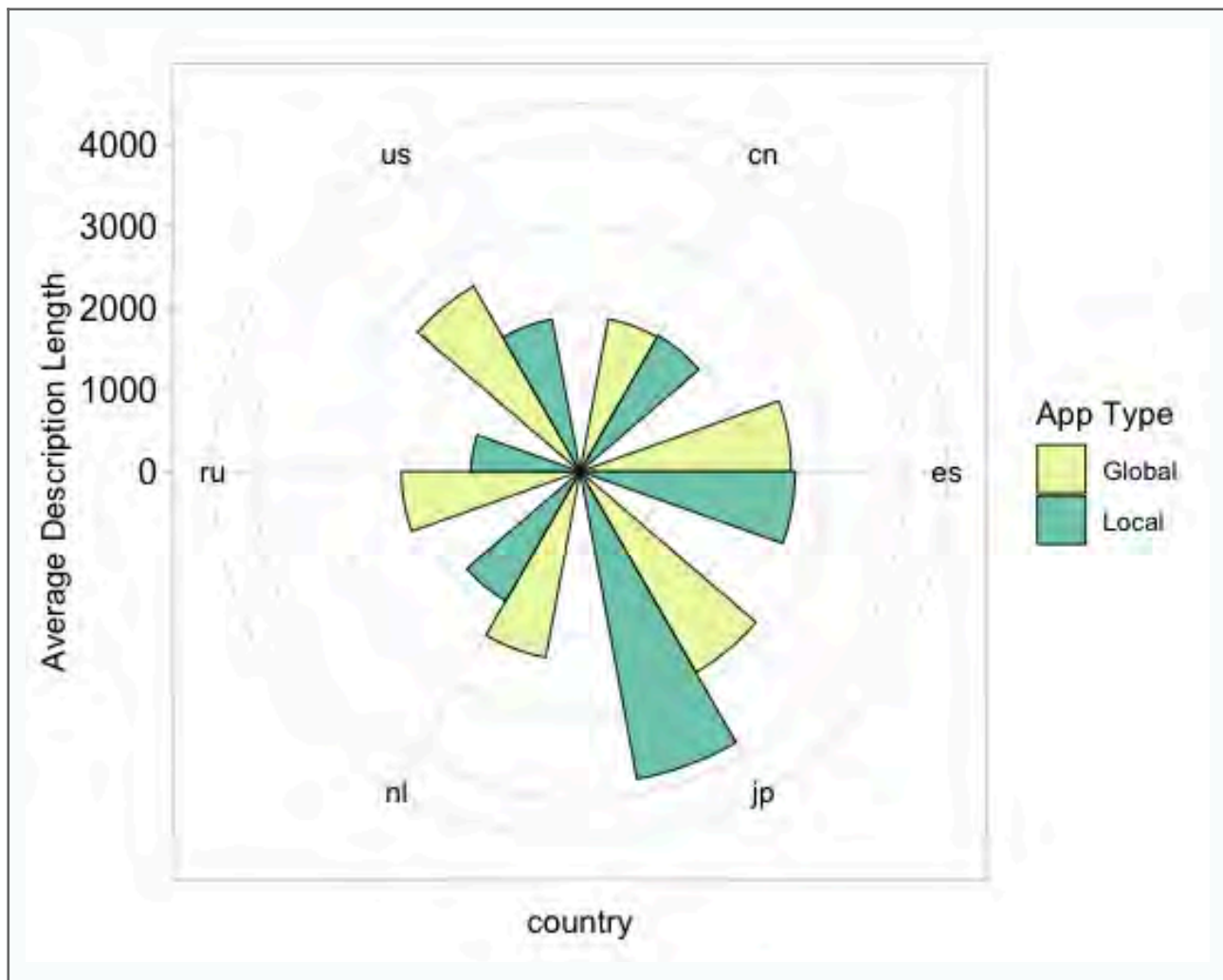
Figure 3.3. Radial bar chart displaying the average app description (translated version) length (expressed in number of characters) for 6 countries and breakdown in local and global apps.

In Russia and the Netherlands, especially in local apps, descriptions are very concise, mentioning services and capabilities but not exploring them in a detailed format. In contrast, Japanese job platforms tend to have verbose and detail-oriented value propositions, with some apps approaching 5,000–6,000 characters (e.g., Rikunavi Next, dJob).

Communication styles also vary by country, with Russia favouring a sober and formal style, while China and Spain prefer informal approaches. For example, in the Chinese App Store, the content is characterised by an informal, lighthearted, and colloquial tone, often using catchy and playful claims, as seen in the app SEEK ('The SEEKRET? There is no secret to finding the right job').

Local Spanish apps like CornerJob or InfoJobs also employ a conversational and informal style, making frequent use of rhetorical questions to capture the user's attention ('Do you want to find or change jobs? Download InfoJobs now').

Interestingly, in Japan, we also find the only government-run app in the entire case study, Hello Work, a site for employment support and promotion operated by the Ministry of Health, Labor, and Welfare. This results in a more sober, detached, and functional communication style focused on being informative rather than heavily oriented toward customer acquisition through SEO-optimised content.

Employment Stability and Flexibility

Structural differences, both at the country level and app type, could be observed under the parameters of employment stability and flexibility. As depicted in Figure 3.4, Japan showcases a significant prevalence of part-time, temporary, and contract opportunities, particularly on local platforms like Townwork, JOB, and dJob. One notable example is dJob, where users can earn points by engaging in gamified experiences during their free time ('Why not start using your smartphone to make good use of your free time, such as when you are travelling by train or doing housework?'). These points can be redeemed as tokens at convenience stores, cafes, shops, and more. Tasks such as surveys, monitoring, and data entry are presented as missions to advanced levels and they can be so simple that they can make labourers feel alienated and lacking intellectual stimulation—a notion even discouraged by the platform itself ('Data entry work may not be able to be completed if the user concentrates!').

country	app_type	part-time	freelance	temp	contract	task	full-time	permanent
cn	Global	1	0	1	1	0	1	0
cn	Local	1	0	0	0	0	2	0
es	Global	2	1	1	4	0	2	0
es	Local	2	0	0	6	1	0	0
jp	Global	3	2	0	0	0	2	0
jp	Local	108	0	2	4	0	21	0
nl	Global	1	3	0	4	0	1	0
nl	Local	1	8	10	0	0	1	0
ru	Global	0	0	0	0	8	0	0
ru	Local	5		3	0	17	0	0
us	Global	5	2	4	2	0	5	0
us	Local	1	0	0	0	0	1	1

Figure 3.4. Frequency of words or root words linked to job (in)stability and (in)security across the six national App Stores with a breakdown of local and global apps.

In Russia, both local and global apps offer on-demand micro-tasking jobs, promising instant rewards and secure payments for freelancers with no specific skills or prior experience required. Platforms like YouDo.com, Toloka.ai, BeMyEye, and Yandex Smena facilitate tasks such as evaluating web page content or map accuracy (Toloka.ai) and on-site activities like product display, order assembly, or point-of-purchase transactions (Yandex Smena). BeMyEye is particularly popular either, serving as a mobile crowdsourcing platform that gamifies micro-tasks to collect field marketing data for major brands such as Coca-Cola, Nestle, and Heineken.

While Japan, the Netherlands, and Russia offer a wide range of temporary employment opportunities, China and the US lead in providing stable full-time positions, supported by global platforms like Glassdoor and Indeed as well as local apps such as BOSS and 51Job. These apps seamlessly help candidates find occupations in qualified sectors and with higher degrees of stability.

Data Privacy, Security, and Anonymity

In the Chinese App Store, job hunting is portrayed as a secure experience for candidates, as demonstrated by the BOSS app, which explicitly emphasises its mission to protect users against scams and fraud ('Strict review mechanism, zero tolerance for fake companies!').

Anonymity and privacy are highlighted as significant aspects that can provide access to insider knowledge about specific companies and industry segments, as communicated by the SEEK app ('SEEK Company Reviews is a place where you can find trusted information about companies, written anonymously by employees') and by Zhaopin Recruitment, which allocates significant power and agency to the user's end ('Block companies of your own choice and keep your resume safely invisible').

Although issues related to privacy and security are often addressed in the former apps, both Chinese and Russian local apps lack official privacy policies, cookie policies, legal statements, and terms of service, which are standard components of most global apps and local apps in Western countries compliant with GDPR and CCPA regulations.

In terms of community-building features, networking opportunities, and knowledge sharing to navigate the job market effectively, global apps in Japan, the Netherlands, and the US appear to have a competitive advantage over others.

country	app_type	conn	commun	shar	personal	priva	anonym
cn	Global	1	8	2	7	1	3
cn	Local	1	3	4	2	2	0
es	Global	1	6	3	7	3	0
es	Local	0	1	1	1	0	0
jp	Global	9	4	3	4	3	0
jp	Local	0	0	0	0	2	0
nl	Global	6	7	7	5	3	0
nl	Local	1	0	0	2	0	0
ru	Global	1	2	1	1	0	2
ru	Local	0	1	0	4	1	0
us	Global	12	7	8	5	6	2
us	Local	3	0	0	1	4	0

Figure 5. Frequency of words or root words linked to personal privacy across the 6 national App Stores with a breakdown of local and global apps.

Discussion

The study's findings reveal a highly fragmented discourse and a diverse landscape across the six domestic App Stores we examined. Despite this complexity, valuable insights emerged from our research.

We observed that app descriptions contained a substantial number of words in high-context cultures like Japan, whereas they were relatively succinct for Russia and China, which are also categorised as high-context cultures.

Moreover, we noted a significant emphasis on personal privacy, anonymity, and security in China, despite its low score in the cultural dimension of individualism. However, this emphasis lacks robustly structured policies that should be implemented and delivered to end users.

Regarding flexibility and stability, our observations indicate that many of the platforms we analysed are contributing to the platformisation of digitally mediated service labour within the

on-demand economy (Van Doorn, 2017), as also demonstrated with the former investigation of the freelance app TaskRabbit, which offers limited job security or protections (Sharma, 2018). This underscores the ongoing challenges faced by gig workers in securing stable employment within this ecosystem.

Limitations

App descriptions are not self-sufficient objects to provide a holistic perspective of job platforms' operating models. Future investigations could incorporate app reviews, professional surveys, job descriptions, company blog posts, and press releases to better understand cross-national working cultures.

Additionally, relying on the Google Translate API for literal translations of app descriptions within Google Sheets limited our ability to capture the nuanced idioms necessary for adequate content analysis.

Finally, we compiled a list of the top-10 applications for each country based on their appearance in March 2024. A comprehensive investigation of the App Store should also consider the long-tail phenomenon.

Conclusion

If globalisation implies relentless cultural homogenisation, job platforms both reflect and perpetuate diverse cultural values at work as they facilitate connections between job seekers and hiring agencies.

Previous studies have argued that business and work offer a prime vantage point for observing culture in action due to the high stakes involved However, there is no universal consensus across nations on the inherent value of work. Previous studies claimed that 'no better arena for observing a culture in action than business because survival is at stake' (Piller, 2012), but it is not universally and cross-nationally agreed what is the inherent value of work.

Northern European countries, such as the Netherlands, are traditionally marked by a strong moral commitment to the value of labour, influenced by past Puritan (or Protestant) ideals. This work ethic views labour as a means of redemption or salvation and can sometimes lead to workaholism (Snir et al., 2006) and work exhaustion, epitomised by the Japanese concept of 'Hirō', meaning labour fatigue. In contrast, Southern European countries, like Spain, conventionally emphasise the importance of work-life balance by shifting a person's self-realisation away from core work duties to leisure time, drawing on the concept

of 'otium' from Latin, which underscores leisure for self-actualization activities including play, relaxation, contemplation, and academic pursuits. Therefore, the perceived value of business and working-related apps is a localised and contextualised experience that cannot easily be abstracted and applied seamlessly across different professional scenarios.

Working cultures can be effectively analysed through multilevel models (Erez et al., 2004) that encompass a hierarchy of nested levels—individual, group, organisational, and global—each mutually dependent on the others (Snir et al., 2006, p. 380). This degree of entanglement is augmented by an additional layer of complexity represented by job-centric platforms, which act as sophisticated orchestrators of an intricate web of relationships between job seekers and hiring agencies, adhering to domestic or global definitions of work or crafting new ones coherent with the platform's identity.

Acknowledgements

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4

National Health and Fitness App Cultures

An Analysis Across American, Asian, and European App Stores

Winnie Lee · Laura Dea Vamper · Cong Hung Đinh

Abstract

National health and fitness apps have emerged to assist local users in improving health remotely, promoting local health norms tailored to each country's health situation. These apps customise services to meet local users' health needs and habits, addressing the health cultures specific to each nation. Our research investigates how national factors influence these apps' operations and content across 11 countries. We analyse the top-10 health and fitness apps in each country, focusing on their adaptation to local health practices. Our findings reveal differences in emphasised health aspects across Asia, America, and Europe. Developers generate revenue by customising app offerings through subscriptions or in-app purchases, providing exclusive benefits for local users. This study contributes to understanding how national health cultures shape the features and services of health and fitness apps, enhancing their relevance and accessibility to users worldwide.

Key Points and Findings

- Health and fitness apps in Asian countries focus on how people manage their health based on metrics. This contrasts with some countries in the Americas or Europe, where health and fitness apps primarily promote exercise.
- Developers from some countries attempt to monetise local health practices and norms in other countries by customising their health and fitness apps to align with local interests, generating revenue through subscriptions or in-app purchases.

Introduction

In 2020, when the COVID-19 pandemic was at its peak, health and fitness apps played a crucial role in maintaining people's healthy lifestyles from home due to the strict lockdown (Ang, 2020). In the post-pandemic period, health and fitness apps are still a trend in many countries (Angosto et al., 2023). According to Smith (2022), more national health and fitness apps are being developed as more people care about improving their health remotely to adapt to the contemporary health situations in their countries. In developing these national apps, developers customise offerings for local users. These offerings may include different packages of customised exercises or sessions for body or mind training in specific countries, which go hand in hand with additional information about tracking the performance of users' health activities (Stancu et al., 2022). In addition, such customisation of national health and fitness apps is combined with the personalisation of available services or features from these apps (Millington, 2014). It shows that health and fitness app developers try to address local health norms in specific countries and local users' personal preferences simultaneously.

In order to investigate national health and fitness apps in the context of national health cultures, our main research question is: *How do national health and fitness apps in the local Apple App Stores reflect national health cultures?*

Through this question, our research aims to understand what aspects of health and fitness are reflected through these national apps' content, services, or functions in particular countries and what type of offerings are available for local users. Regarding health and fitness apps, previous research explores users' motivations for adopting healthy lifestyles, users' health-related communities based on their shared app usage behaviours, and the provision of health knowledge for users (Goodyear et al., 2019; Molina & Myrick, 2021; Vermeulen &

Grobbelaar, 2022). However, such research does not focus on the nationality of health and fitness apps, including local apps' offerings and local health norms in specific countries. Thus, there is a gap in understanding how national health and fitness apps customise their offerings and reflect national health norms through local users' engagement with these apps. Filling this gap, we want to investigate how people carry out health activities and use health services from national health and fitness apps' offerings in their countries.

Literature Review

In the United States, the National Institutes of Health (2020) and the Institute for Health Metrics and Evaluation (2019) both rank ischemic heart disease as the most frequent health issue. Ischemic means that 'the heart is not getting enough blood flow and oxygen' (US Department of Veterans Affairs, 2023), which may be caused by narrowed heart arteries or a blockage in the blood flow (Institute of Medicine, 2010). The second most common disease in the United States is cancer, more specifically lung cancer (IHME, 2019f). In third place, lower respiratory diseases, such as COPD (e.g., chronic bronchitis), shortness of breath, and asthma, are the most common health issues. These are followed by cerebrovascular diseases, such as stroke and aneurysm, in fourth place and in fifth place is Alzheimer's disease (IHME, 2019f). In Mexico, the most frequent health problems are ischemic heart disease, diabetes, chronic kidney disease, liver disease, and stroke. In Colombia, there has been some contradiction between what the population thinks the most concerning health problems are and what they statistically are. According to public opinion, mental health issues, cancer, stress, diabetes, and obesity are the most frequent health problems (Mendoza, 2023). However, the Institute for Health Metrics and Evaluation (2019) states that ischemic heart disease, interpersonal violence, stroke, COPD, and Alzheimer's disease are the most common health issues. The reality is most likely a mixture of these two researches. In Brazil, the Institute for Health Metrics and Evaluation (2019) describes that the most common health issues are ischemic heart disease, stroke, lower respiratory infections/COPD, interpersonal violence, and diabetes. Overall, it can be stated that Americans mostly struggle with heart problems.

Moving onto Europe, in the United Kingdom, the most common health issues are heart disease, cancer, stroke, lung disease, and liver disease (Kingston, 2018). The French nation struggles with ischemic heart disease, Alzheimer's disease, stroke, lung and colorectal cancer the most (IHME, 2019h). In Germany, the Institute for Health Metrics and Evaluation (2019i) reports that people deal with ischemic heart disease, stroke, lung cancer, Alzheimer's disease, and lower respiratory disease (COPD) most frequently. Lastly, the most common health issues

for Italians are ischemic heart disease, stroke, Alzheimer's disease, lung cancer, and hypertensive heart disease (IHME, 2019j). Hypertensive heart problems mean a variety of changes in the left side of the heart (Tackling & Borhade, 2023), which are caused by untreated high blood pressure being present for a long time (Penn Medicine, 2022). Thus, it can be stated that, similarly to the Americas, the most common health issue in Europe is also heart disease.

Lastly, looking at Asia, the most common health issues in India are ischemic heart disease, lower respiratory disease, stroke, diarrheal diseases, and neonatal disorders (IHME, 2019). Diarrheal diseases are especially common among children (WHO, 2017). Diarrheal diseases appear in environments with poor hygiene and affect children who are malnourished or who have consumed contaminated food or drinking-water (WHO, 2017). According to Singhal (2022), other fairly common diseases in India are diabetes and obesity, which are the results of the sedentary lifestyle that many people lead there. In South Korea, the most frequent health issues are stroke, ischemic heart disease, lung cancer, Alzheimer's disease, and lower respiratory infections (IHME, 2019c). It is important to note that following these, the sixth most common health issue is self-harm, which has decreased over the past decade (it used to be in fourth place), but it still represents how South Koreans tend to struggle a lot with mental health issues (Kim & Hur, 2019). Finally, in Japan, the most common health problems are Alzheimer's disease, stroke, ischemic heart disease, lower respiratory infections, and lung cancer (IHME, 2019a). Alzheimer's disease has increased from third to first place in the past ten years, which is highly concerning for the well-being and health of Japanese people. The cause of this increase is that 20% of the population are elderly people (over 65 years old), who often suffer from brain disorders (Clinical Trials Arena, 2017). Despite not being the first place in South Korea and Japan, ischemic heart disease is still the overall most common health issue in Asia, similarly to Europe and the Americas.

Method

In this research, we use the local Apple App Stores as the basis for scraping data about national health and fitness apps. According to Dieter et al. (2019), app stores promote 'app relatedness' in specific categories (p. 3). It emphasises that relevant apps for particular categories are displayed based on location, country, and language. Complementing this mechanism, app stores also use algorithms to sort and rank these apps via their popularity (e.g., most downloaded apps), ratings, reviews, or frequency of app updates (Dieter et al., 2021; Rotstein, 2023). Algorithmic app sorting and ranking are often combined with the

editorial logic (e.g., the editor's choice list), which determines apps' visibility in specific countries. With the display of apps based on particular nations and app stores' algorithms, app stores create the national top app charts to show different lists of popular apps in each country. In other words, these charts give an overview of 'the currently popular apps by content category' (e.g., health and fitness), which feature national apps depending on the selected country in app stores (Lupton, 2014, p. 612).

Data Collection

Before we carry out the app data scraping process, we start by choosing countries. In our selection, there are 11 countries: India, Japan, Korea, the US, Brazil, Mexico, Colombia, the UK, Germany, France, and Italy. We chose these countries because they belong to a list of the top countries with the most health and fitness app downloads (Giedrė, 2024). Moreover, the selected countries also belong to a list of the top countries with the most App Store users (Tablas, 2023).

After selecting the above 11 countries, we visit the top app chart of the national App Store for each country. We change the ISO code of the country between 'https://apps.apple.com/' and '/charts/iphone' in the link to the specific local top app chart. For example, the top app chart of the Korean App Store can be accessed via 'https://apps.apple.com/kr/charts/iphone'. Based on this format, we use the following ISO codes in our research: 'in' (India), 'kr' (Korea), 'jp' (Japan), 'us' (United States), 'br' (Brazil), 'co' (Colombia), 'mx' (Mexico), 'gb' (United Kingdom), 'de' (Germany), 'fr' (France), and 'it' (Italy).

In each local top app chart, we select 'Health and Fitness' as the main app category. Next, we choose the top-10 national health and fitness apps from each local top app chart. In the above 11 countries, there are 110 national health and fitness apps in total that have been chosen. After choosing these apps, we scrape their data using the 'App Studies Capture & Analysis Toolkit' (n.d.). This tool is built into the broader 4CAT data capture and analysis toolkit (Peeters & Hagen, 2022). To collect data about the 110 selected national health and fitness apps, in the 'Create new dataset' section, we choose 'App Store' as the data source and 'App IDs' as the query type. Then, for each set of the top-10 national health and fitness apps in each country, we manually put the list of their IDs into the tool, opt for full application details, and choose the local language. An example of this process is illustrated in Figure 4.1 below.

After the app data scraping process, we combined the collected results into a single dataset to analyse the chosen national health and fitness apps. In this dataset, we translate the local app's name and description into English if this name and description were not in English

originally. We also find and document the origin of the app's developer, which is unavailable in the collected results.

Figure 4.1. Scraping data about the top-10 health and fitness apps from the App Store's top chart in the US, followed by repeating the process for each country.

Analysis

National Health and Fitness Apps' Subcategories

Analysing the descriptions of national health and fitness apps from the above 11 countries, our findings highlight the following subcategories: Exercise, Health monitoring, Nutrition, Public health, Psychology, Pharmacy, and Other. These subcategories help understand what aspect of health and fitness these national apps specialise in and how they customise their offerings for local users (Kudelka, 2023; Wikipedia, 2024).

The 'Exercise' subcategory includes apps that give knowledge about physical training, offer suitable workout plans, provide access to virtual gym coaching, and connect users to multiple in-app videos about home exercises. Meanwhile, the 'Health monitoring' subcategory features apps that help track or monitor different aspects of users' health status (e.g., heart rate, blood pressure, menstrual cycle) and activities (e.g., steps, running miles) based on metrics. In each country, exercise and health monitoring apps combined account for the highest portion of the top-10 national apps (Figure 4.2). Specifically, health monitoring apps are more popular than exercise apps in France, the US, and Asian countries (India, Korea, and Japan). In Figure 4.3, these health monitoring apps (e.g., Strava, ShutEye®, Heartwell: Track Health, Wrist Doctor 9988, d Health Care and Monitoring) address local users' habits of using metrics to track and evaluate their health conditions. However, exercise apps are more popular than health monitoring apps in Brazil, the UK, and Germany. According to Figure 4.3, these exercise apps (e.g., Gympass, JustFit, and Komoot) reflect local users' practices of training their bodies at home or in the gym through customised training exercises. In other countries, the number of exercise apps is equal to the number of health monitoring apps. Despite this distribution, exercise and health monitoring apps share the same goal of addressing heart disease as a prominent health issue in every country (IHME, 2019; Kingston, 2018; Singhal, 2022; National Institutes of Health, 2020).
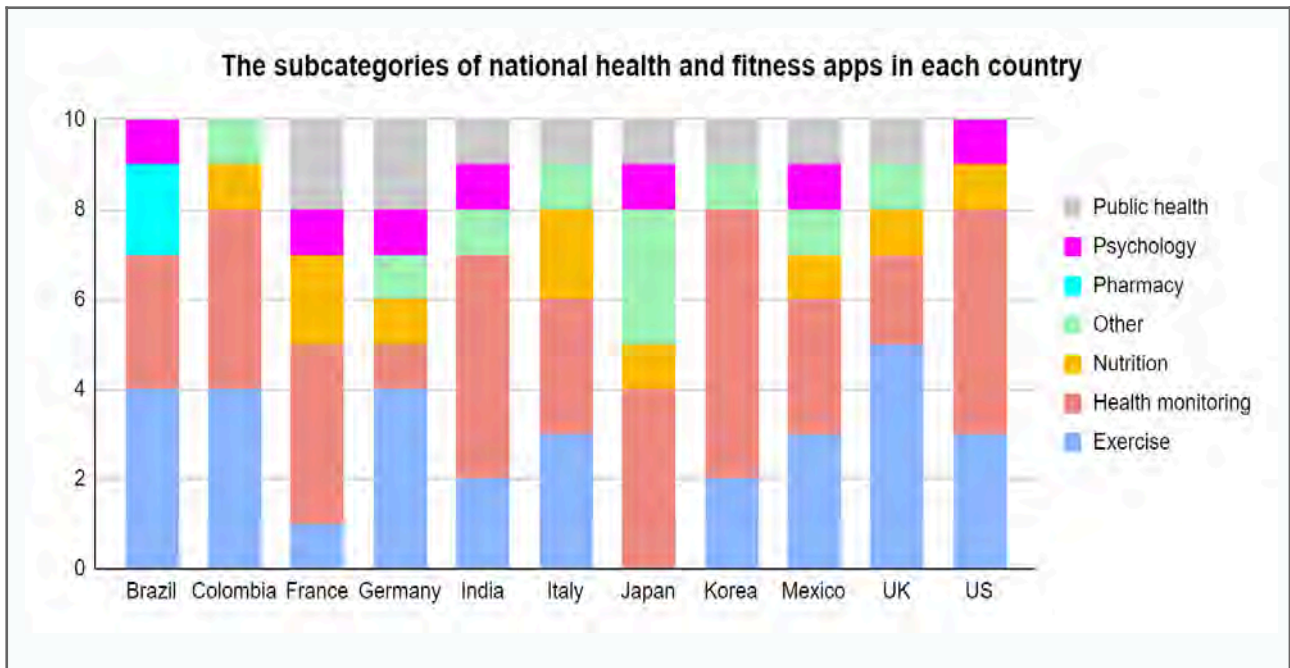
Figure 4.2. The distribution of national health and fitness apps in each country, categorised by subcategories of health and fitness.
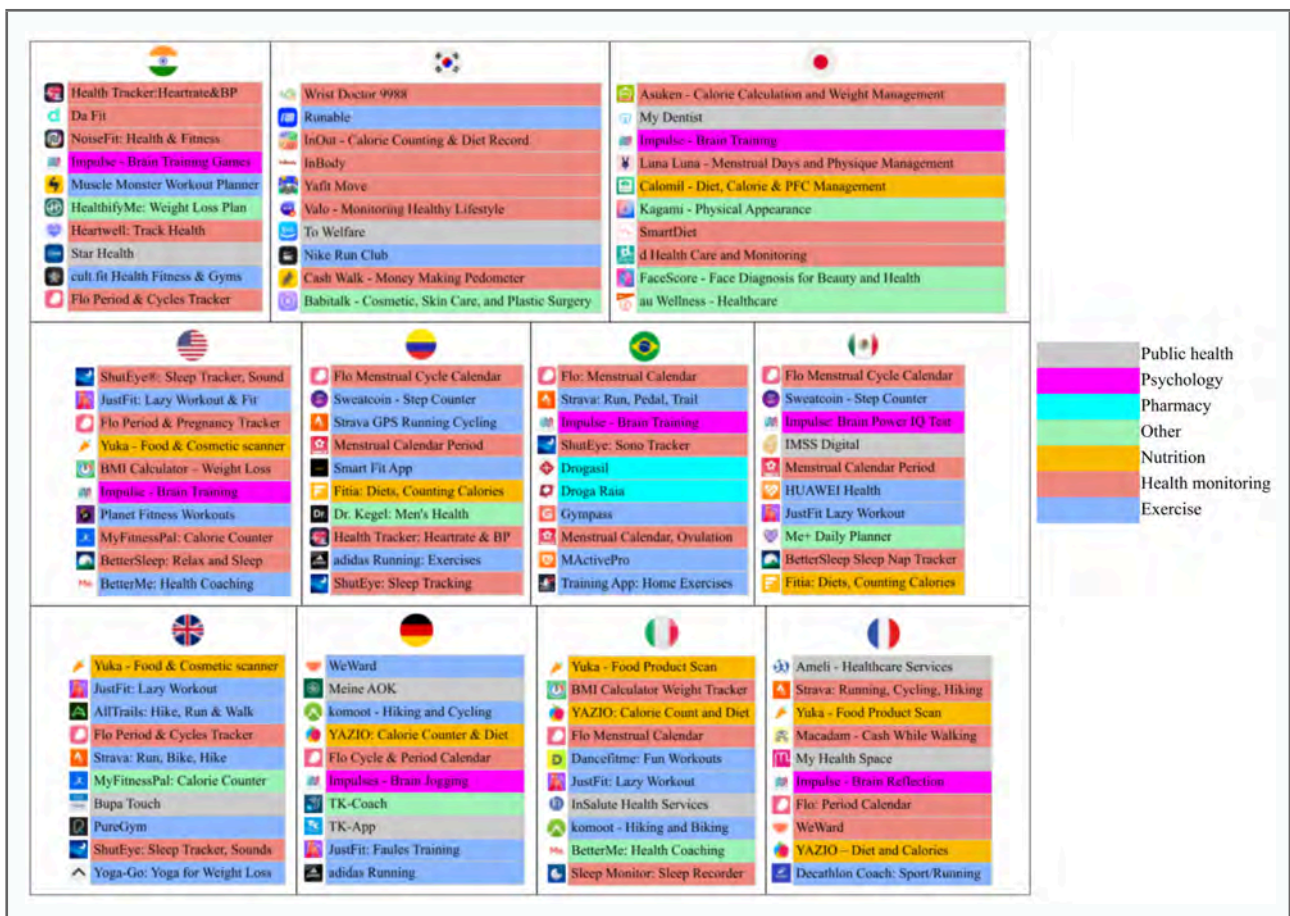

Figure 4.3. The top-10 national health and fitness apps in each country, categorised by subcategories of health and fitness.

Moreover, 'Nutrition', 'Psychology', and 'Public health' are the next common subcategories of the top national health and fitness apps in 11 countries. Nutrition apps recommend healthy diets for local users to improve their eating habits or provide knowledge about ingredients in different types of food consumed. Meanwhile, psychological health apps in the 'Psychology' subcategory give local users focus sessions with a time limit to train their mind or brain, which deal with their mental health status. Lastly, public health apps offer access to national health insurance or healthcare services by letting users manage their health records (e.g., prescriptions, medical history) and communicate with health practitioners (e.g., doctors) in their countries. All these three subcategories appear together in the charts of the top national health and fitness apps from Japan, Mexico, France, and Germany (Figure 4.2). In the meantime, most other countries have one or two out of three subcategories. For instance, there are nutrition and public health apps (e.g., YAZIO, InSalute Health Services) in Italy without psychological health apps, or public health apps in Korea (e.g., To Welfare) without nutrition and psychological health apps (Figure 4.3). Thus, the distribution of nutrition, psychological health, and public health apps is uneven in 11 countries. These apps help prevent the development of Alzheimer's and diabetes among local users, which are also common health issues in most countries besides heart disease (IHME, 2019; Singhal, 2022; National Institutes of Health, 2020).

Besides the above subcategories, the 'Pharmacy' subcategory is really unique to Brazil (Figure 4.2). Especially, 'Drogasil' and 'Droga Raia' are two local apps that offer medicine purchase and delivery for users by coordinating with the local pharmacies in Brazil (Figure 4.3). This subcategory is also rarely seen in other countries. Except for Brazil, apps relating to medicine in the national app stores of other countries belong to a more suitable category (e.g., 'Medical') instead of 'Health and Fitness'.

Lastly, the 'Other' subcategory includes apps that focus on the mixed purposes of health management. This subcategory appears in most countries except for the US, Brazil, and France (Figure 4.2). Specifically, these apps (e.g., HealthifyMe, Dr. Kegel, TK-Coach) offer users online body training sessions, recommend healthy diets, track activity levels, provide access to metrics about their physical health status, and give users health knowledge about specific parts of their bodies (e.g., skin, muscles). Therefore, apps in the 'Other' subcategory allow local users to manage their health and carry out different health practices all in one place. They mainly promote the interconnection between exercise, health monitoring, and nutrition.

App Developers' Countries of Origin

Figure 4.4 shows the top-10 health and fitness apps from 11 countries, 110 apps in total, with the origin country of the applications and the country of use connected by a line. From the bar chart in Figure 4.4, the UK has the largest market share with 13 apps, followed by the US, Singapore, Germany, and Cyprus, each with over ten apps. Most health and fitness apps developed in the countries listed above are used in Western countries. However, one of the top-10 health and fitness apps in South Korea, Japan, and India also originated from these countries. This also demonstrates that the listed countries strongly influence the App Stores of different countries. Especially since the Mexican and Colombian App Stores encourage foreign apps more.
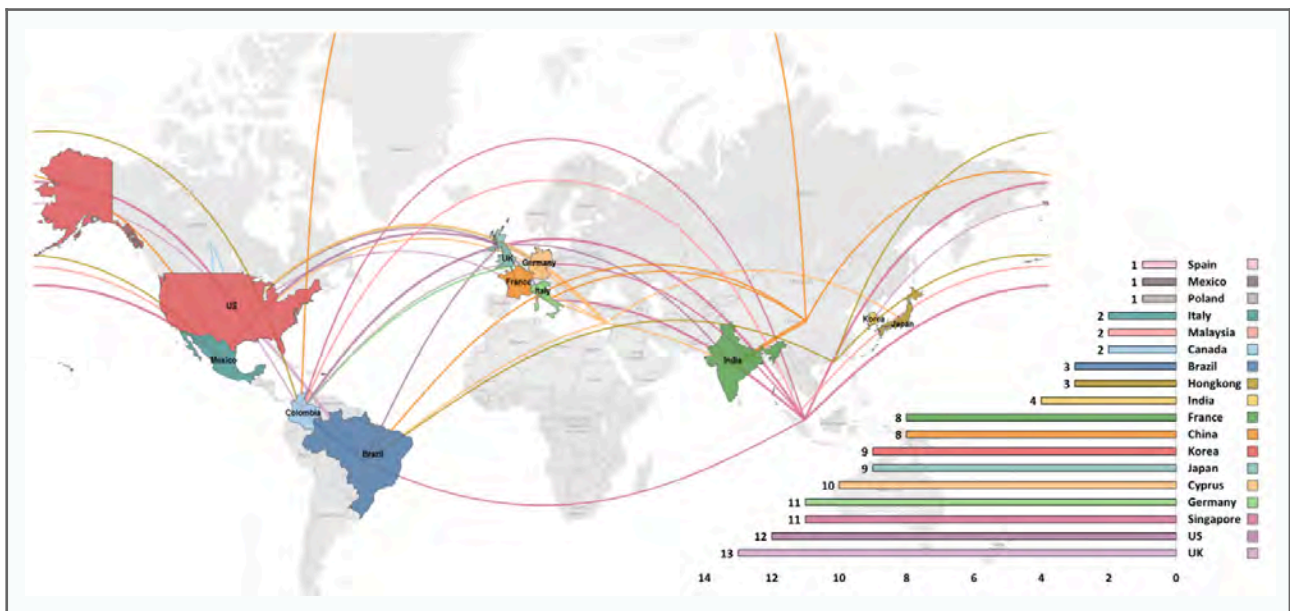

Figure 4.4. World map showing the researched countries along with the national health and fitness apps and the origin countries of the app developers.

On the other hand, countries like Spain, Mexico, and Poland show a low share, with only one app developed in each country, and these are also prioritised in Western countries' App Stores. Notably, Korea and Japan each developed nine apps, all of which were used only in their home countries. Lastly, Indian and Chinese apps are thriving equally in India, which shows the tight competition between app developers from these two countries.

National Health and Fitness Apps' Subscription Models

Besides the subcategories of health and fitness, the origins of apps show how app developers in some countries influence local health practices/norms in the selected countries. They optimise subscriptions and/or in-app purchases for customised training or services that focus on local users' health needs. In doing so, they encourage local users to improve their health by engaging with their premium features and offers. Figure 4.5 shows the subscription status of the top-10 health and fitness apps in the 11 countries we studied. This shows that all of the top-10 health and fitness apps in Brazil require a subscription, nine apps in the US require a subscription, and one app does not require a subscription but sells an in-app ad removal service for a smooth experience. The US, Mexico, Japan, and Colombia also have 90 percent of apps requiring a subscription. In these countries, the fact that health and fitness apps require a subscription or in-app purchase does not seem to affect the use and favorability of the app. In comparison, South Korea's top-10 apps all require no subscription and no in-app purchases, which contrasts with the apps in the aforementioned countries. Moreover, this indicates that Korean society favours free apps that don't require a subscription. Also notable is that India has a balance of 50 percent of apps that require a subscription and 50 percent that do not.

Figure 4.5. Subscription requirements for the top 10 national health and fitness apps in each country.

Distinctive Features: Korea, Brazil, and France

Through the analysed subcategories of national health and fitness apps, some typical local apps in some subcategories are only available in one country instead of multiple countries. In examining these typical local apps, our findings show that there are some mechanisms and features developed to align with health norms or practices in specific nations. We have found three typical local health and fitness apps that stood out to us.

Babitalk (Korea)

In the top-10 national health and fitness apps from the Korean App Store, Babitalk (Figure 4.6) stands out as an app that helps local users know more about the health effects of cosmetic surgery. It belongs to the 'Other' subcategory because local users can take part in different online activities on this app, ranging from accessing knowledge about skin health to sharing tips on skin treatment. The combination of health and cosmetic surgery is not or rarely addressed by health and fitness apps in other countries. As many people who do cosmetic surgery in Korea are worried about the health of their skin after such surgery (Jin & Whittall, 2022), Babitalk leverages the local practices of skin care to give users customised information about different types of skin treatments based on these practices (e.g., Ultherapy, InMode treatment). Such information can be accessed directly via the skin knowledge section of this app. Besides skin treatment information, this app also has a posting function in the review section, which allows users to post reviews about how they treat their skin and which skincare products should be used after cosmetic surgery. In these reviews, users can use this function to feature images of their faces to compare the differences between before and after their cosmetic surgery (Figure 4.6). Additionally, this app's chat feature lets users connect quickly with cosmetic surgeons or people who have done cosmetic surgery in Korea, besides reading reviews. Thus, Babitalk offers local users skin treatment knowledge in the context of cosmetic surgery in Korea and access to online conversations based on their interactions with other people.
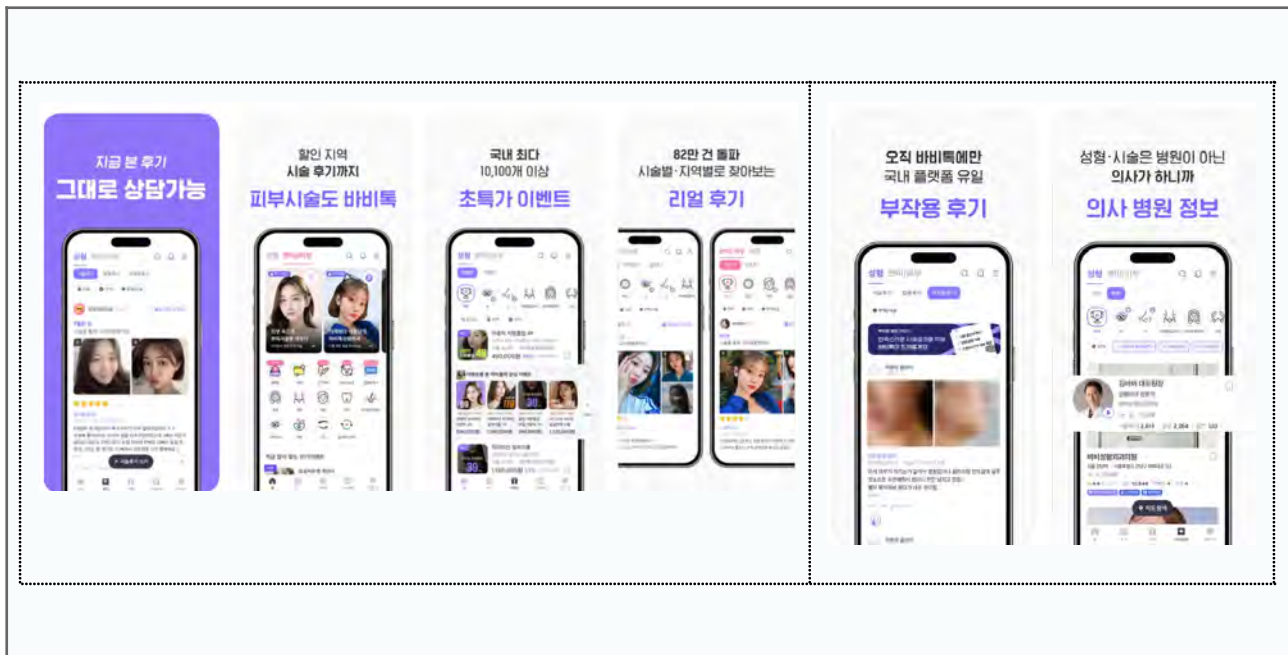
Figure 4.6. Screenshots of Babitalk from the Korean App Store.

Drogasil (Brazil)

Another typical local app that we found interesting is Drogasil from the Brazilian App Store. This app belongs to the 'Pharmacy' subcategory because it promotes the purchase and delivery of medicines from the local pharmacies in Brazil. Buying and delivering medicines through the app environment is not or rarely seen in the top national health and fitness apps from other countries. As people in Brazil have the habit of purchasing medicines online instead of going to the local drug stores (Gondim & Falcão, 2007), Drogasil gives users a list of commonly used medicines (e.g., flu antiviral drugs) that they can order quickly (Figure 4.7). This app functions in quite similar ways to food ordering or e-commerce apps. When ordering products like drugs, users can receive these products from the delivery service without going outside their homes. Thus, Drogasil offers local users the convenience of buying the right medicines quickly to cure common diseases and take care of their health from home. In addition, this app has a point collection system that encourages local users to buy more medicines to get more points. With a certain amount of points, they can exchange them for access to more exclusive benefits (e.g., cosmetics as prizes in medicine purchases, exclusive health consultations at the nearby local pharmacies, and exclusive discounts on specific medicines). Therefore, Drogasil helps maintain the habit of buying medicines online among Brazilians, which provides quick access to health treatments requiring medicines.
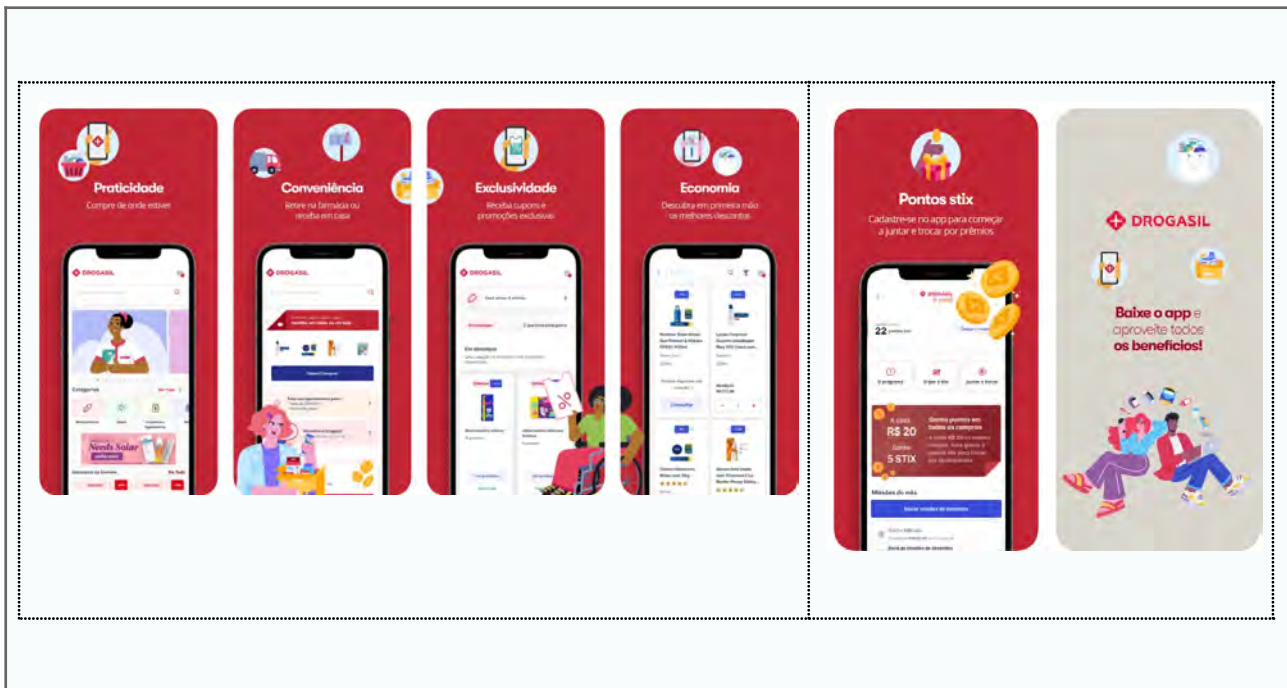
Figure 4.7. Screenshots of Drogasil from the Brazilian App Store.

Macadam (France)

Besides Babitalk in Korea and Drogasil in Brazil, Macadam in France is also an interesting local app, according to our findings. It belongs to the 'Health monitoring' subcategory because it focuses on tracking steps from the activity of walking among users to help monitor their physical health. Macadam has a notable function that connects the tracking of walking steps to money earning for local users (Figure 4.8). This connection is rarely seen in normal step-tracking or fitness apps from other countries. Specifically, every step taken equals a specific amount of coins, which users can earn via their walking routine. Users can convert these coins into real money (e.g., euros) to either spend on the promoted products (e.g., sports accessories) from the app's partners or transfer directly to their bank accounts. As walking becomes the habit of many French people (Plantier, 2024), Macadam leverages monetary rewards to encourage local users in France to walk more and track their steps. Additionally, this app has ranking and connection features. In particular, the rank of local users on this app compares the number of tracked walking steps between them. This ranking lets them evaluate if their walking routine is effective compared to others. Besides this ranking, local users can view different profiles and send connection requests to others. These requests help build good relationships between users who share the same interest in walking and may even live in the same areas of France.
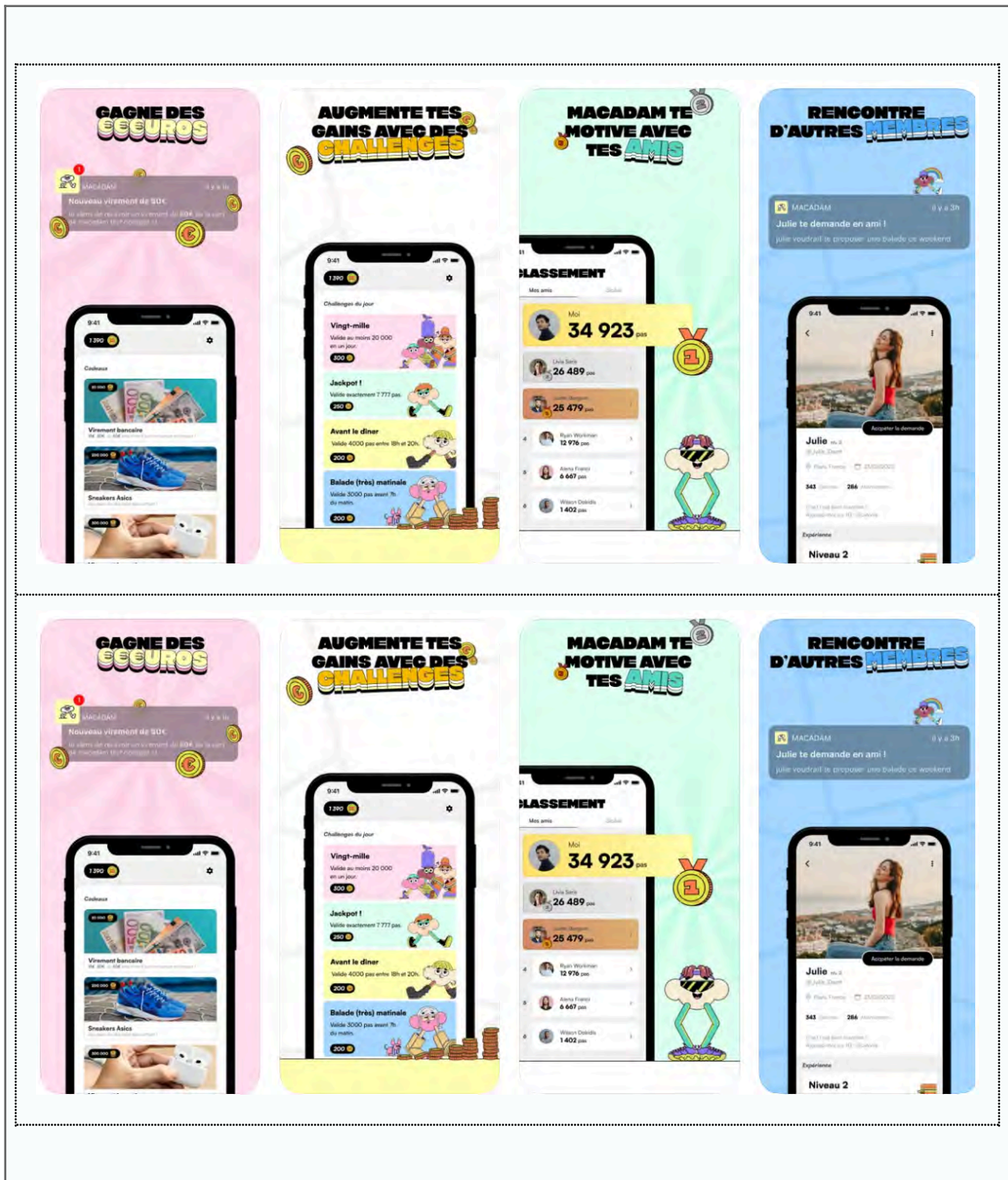
Figure 4.8. Screenshots of Macadam from the French App Store.

Discussion

In answering our research question, the above findings emphasise that the national health and fitness apps in the national app stores reflect local users' health preferences in specific

national health cultures. In particular, health and fitness apps in Asian countries address local users' preferences for using metrics through tracking functions to see their health status and the performance of their physical activities. In the health cultures of most Asian countries, people perceive health metrics on these apps as a means to motivate themselves to maintain their healthy habits and routines (Data Bridge Market Research, 2021). Meanwhile, health and fitness apps in most countries in America and Europe address local users' preferences for doing more exercise, managing their food consumption habits, and training their minds. In the health cultures of most countries in America and Europe, these preferences indicate that local people take a comprehensive approach to health management instead of focusing on only some particular aspects of health and fitness. Despite differences in local users' health preferences through specific national health cultures, the national health and fitness apps in Asia, America, and Europe share the goal of preventing some similar physical and mental health issues. For example, these issues include heart disease, diabetes, cancer, stroke, and Alzheimer's disease (Clinical Trials Arena, 2017; Kingston, 2018; IHME, 2019; Singhal, 2022; Mendoza, 2023; Tackling & Borhade, 2023).

Furthermore, the developers of some national health and fitness apps have different origins from the countries where these apps operate. The differences between these developers' origins and their apps' operating countries emphasise that they increase their app market shares in other countries. With more impact on particular national app markets, these developers attract local users to customise subscriptions or in-app purchases with exclusive health benefits that suit their health needs, practices, and preferences. According to Lupton (2014), health and fitness app developers incorporate commercial interests into developing exclusive services or functions for users' health management habits. These commercial interests lead to the provision of customised subscriptions or in-app purchases for local users based on the characteristics of particular national health cultures. However, some national public health apps in some countries (e.g., health insurance or healthcare service apps) do not follow the subscription or in-app purchase model. As the developers of these apps are health insurance or healthcare companies, local users can have free access to advanced apps' services or features if they are already these companies' customers.

In addition, some local developers make their national health and fitness apps unique to their countries, which are unavailable in other countries. Our analysis of three typical local health and fitness apps underscores the role of apps' specificities in motivating local users to follow specific health norms in specific national health cultures. For instance, Macadam in France leverages its ranking features to motivate local users to compete for taking more walking steps as the norm in French health culture, which lets them get more monetary

rewards. Stancu et al. (2022) perceive health and fitness apps as crucial channels to maintain users' motivations to adopt healthy habits and routines. This perception applies to the context of national health and fitness apps. Some particular features of these apps boost local users' self-motivation, which helps maintain their habits and routines of managing their health based on local health norms in the countries where they live.

Conclusion

In conclusion, the analysis of national health and fitness apps across 11 countries reveals a reflection of local health cultures in their design and functionality. These apps, categorised into subcategories such as Exercise, Health Monitoring, Nutrition, Psychology, and Public Health, display specific health preferences in each nation. For instance, Asian countries prioritise metric-based tracking for health monitoring, while American and European nations focus on exercise and health management. Moreover, the origin of app developers influences app features and subscription models, with some apps tailored to local practices and needs. Unique apps like Babitalk in Korea, Drogasil in Brazil, and Macadam in France demonstrate how localised apps align with national health norms. Overall, national health and fitness apps serve as cultural commodities, shaping and reinforcing health behaviours within their respective societies.

Data Availability

The data that supports the findings of this study is available on Google Sheets at https://docs.google.com/spreadsheets/d/1k1WFjMWhhGXrXoWRYMXsGPOCphoWO6Hsvodwvmeukc E/edit?usp=sharing.

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