Can China's and India's operating systems achieve global growth?

By **Samuel Abraham** - August 15, 2023

Image courtesy of Huawei.

Emerging from the nascent push toward technology sovereignty in Asia-Pacific, independent operating systems are slowly making their mark. This shift, driven by a desire for innovation, autonomy, and a competitive edge, can potentially reshape an industry traditionally dominated by a select few.

Huawei, a global provider of information and communications technology infrastructure and smart devices, is one of the key players in this movement in China. In response to an evolving tech landscape, the company has introduced its own mobile operating system, HarmonyOS. According to Counterpoint Research data, HarmonyOS now holds an 8% share of the Chinese smartphone market and a 2% share globally since its launch in 2022.

Another Chinese initiative, openKylin, is the product of the collective effort of 3,000 developers, more than 70 special interest groups, and 200 enterprises. It's now heralded as the nation's first open-source desktop operating system.

However, this trend of developing independent operating systems extends beyond China's borders. In India, for instance, the government has funded the Indian Institute of Technology Madras to introduce a domestically created operating system called BharOS, which is designed for high-security applications.

But what is the likely growth trajectory of these operating systems? How will they compete with much stronger and deeply entrenched global incumbents? How do the markets and analysts see these innovations?

HarmonyOS challenges and opportunities

The emergence of these independent operating systems brings its own set of challenges. They need to compete with established platforms, attract developers, and provide a user experience that can rival or surpass that of competitors. However, the potential benefits – increased control over user data, the ability to tailor the system to specific needs, and the opportunity to innovate – make this a trend worth watching.

Despite the potential benefits, the development of an independent OS is a significant undertaking. It requires not only technical expertise but also the ability to attract a community of developers willing to create apps for the new platform.

For instance, Huawei reported that at the end of 2022, there were over two million HarmonyOS ecosystem developers. The company also revealed that the number of monthly active users of Huawei Mobile Services (HMS) had exceeded 580 million, and the number of monthly active users of Huawei ID, AppGallery, and Quick App had surpassed 420 million, 580 million, and 170 million, respectively.

Despite these numbers, the HarmonyOS ecosystem is still in its early stages, especially when compared to established platforms like Android and iOS. One of the key challenges for any new operating system is to offer a unique value proposition that can attract both developers and users. In the case of HarmonyOS, the Super Device functionality — which facilitates easier cross-device interactions compared to other operating systems — serves this purpose. As per Huawei, this functionality is now available on 12 different types of devices.

However, gaining a foothold in the global market is no easy task. As Stuart Randall, the Shanghai-based Director of Operations and Global Lead for Electronics and Embedded Software at Intralink, pointed out, "The successful OS ecosystems rely on a global market and global partners. Google, Apple, and Microsoft have successfully done this but even Microsoft failed in the mobile space, and it is hard for Google to get into the desktop area."

By the end of 2022, HarmonyOS had been deployed on 330 million Huawei devices. Huawei officially launched HarmonyOS 3 officially in 2022, representing a full expansion of the Super Device feature.

According to the company's 2022 annual report, each of the key elements of the HarmonyOS ecosystem — including Huawei Music, Huawei Browser, Huawei Wallet, Huawei Assistant Today, Huawei Mobile Cloud, Huawei Video, Huawei Books, Huawei Themes, AI Search, and Huawei Weather — boasted over 100 million monthly active users.

Petal Search, part of the HarmonyOS ecosystem and a competitor to Google and Bing, supports over 70 languages and is accessible in more than 170 countries and regions outside of China. Petal Maps, offering navigation services for smartphones, smartwatches, and web maps, extends its reach to over 160 countries and regions outside China. Huawei has also reported that its developer community has grown to over

six million registered members worldwide, with more than 220,000 apps now integrated with HMS Core.

BharOS and openKylin

India's BharOS, named after the ancient term for India, "Bharat," is built on the principle of decoupling software from hardware. Karthik Ayyar of JandKSoft, the developer of BharOS, sees this approach as the only way to truly ensure privacy and security. Unveiled by India's Minister for Electronics and IT, Ashwini Vaishnav, BharOS is a Linux-based system. It can operate on any mobile platform that supports Linux, provided that original device manufacturers (ODMs) and system-on-a-chip vendors separate software from hardware.

With regard to its current applications, Ayyar said, "BharOS Services are currently being provided to organisations that have stringent privacy and security requirements whose users handle sensitive information that requires confidential communications on restricted apps on mobiles." However he remarked that globally, regulatory changes are needed to decouple hardware from software, to survive the monopolies that currently dominate the digital lives of people.

One of the critical problems that ODMs currently face is the multiple agreements they have with existing operating system providers. These agreements legally prevent them from supporting or selling devices with alternative operating systems. Until India's competition watchdog intervened, all Android phones sold in India came pre-installed with the company's search app and a full suite of Google apps. In contrast, BharOS comes without any default or pre-installed apps.

So, how does BharOS address the challenge of an absent app ecosystem? The solution lies in private application store services, or PASS providers. Rather than relying on an operating system provider's app store, BharOS allows anyone to build an app platform and enables users to choose their preferred PASS providers.

This flexibility means that people can rally their network to build an app platform or choose a PASS from a telecom provider. Organisations, including the government of India or an Indian public sector body such as its defence ministry or the railways, can construct and operate their own PASS services.

China had also experimented with its own operating system, Kylin, for high-security applications, which was launched in 2001. "Kylin, as far as I can see on the ground here in China, is non-existent in the retail market," said Intralink's Stuart Randall. "I have seen it on some government workstations, but even then it looks like a strange Windows XP lookalike. And remember, even Kylin is based on Linux. I have also seen some state-owned companies using pirated Windows rather than Kylin as it is difficult to use."

However, openKylin seems to have addressed the user experience challenges that Kylin faced, according to initial user feedback. It offers simplified Chinese and English language options, although not all applications have English descriptions. Based on Linux Kernel 6.1, it features a software store with pre-installed applications such as Mozilla Firefox, WPS Office, Vim Text Editor, Weather App, and a video player, among others.

The source code can be accessed by visiting Gitee, the Chinese version of GitHub. It remains to be seen which hardware makers will pair their devices with openKylin.

Global adoption and market strategy

While Huawei's HarmonyOS and its associated ecosystem are expanding, opinions on its potential for global adoption vary. Randall believes that the success of an operating system hinges on its global resonance and ability to form international partnerships.

"Successful OS ecosystems rely on a global market and global partners. Google, Apple, and Microsoft have achieved this, but even Microsoft failed in the mobile space, and Google struggles to get into the desktop area," Randall explained.

When discussing the potential for HarmonyOS to expand to markets outside China, Randall remarked, "The OS doesn't offer anything that Android doesn't, and Huawei is already struggling with its handset sales. It may circumvent ecosystem problems by installing APK files, but it would still need to create its own global version of Google Services. From a consumer standpoint, there is little incentive to switch."

In fact, Huawei's Chinese rivals Oppo and Xiaomi continue to use Android. "I can see Harmony being successful in Huawei products, but I don't see why its competitors like Oppo, Vivo, or Xiaomi would use it. Android works for them and Google isn't a competitor in China. Right now, I see it as a Huawei OS for Huawei products, a bit like iOS but with the unreliability of Android," added Randall.

Despite these challenges, Huawei's HarmonyOS continues to grow, with its market share increasing since its launch. However, its global strategy remains unclear, and it's uncertain whether the company plans to expand its OS into smartphone markets outside its home country, particularly in Europe.

Randall suggests that nationalism in China has played a role in Huawei's success. "Nationalistic consumption is strong here. To expand out of China, it would need to offer something different and build a global ecosystem. I do not know what it offers that's different, and building an ecosystem is difficult when there are incumbent dominant players," he said.

However, Randall also says that emerging markets may be more open to Huawei's OS, especially for its IoT products.

Ivan Lam, Senior Research Analyst at Counterpoint Research in Hong Kong, observes that Huawei has a large installed base of smartphone users and can penetrate its own smart devices ecosystem. He also notes that Huawei is encouraging other smart device suppliers to adopt or open their APIs to HarmonyOS.

Lam added, "Terminals with HarmonyOS had surpassed 220 million devices at the end of 2021. Huawei has built a solid infrastructure in China with a strong installed base and brand awareness, and it enjoys the trust of Chinese consumers. For its current strategy, it is still exploring the Chinese smart devices market, because the market is very huge.

In future, HarmonyOS can possibly step out of China and penetrate overseas markets that still have some room available for increasing Huawei's market share."

The future of independent Asian OSes

Paul Haswell, a technology and data lawyer based in Hong Kong, believes that while it may be hard to compete with Android and iOS, the development of new ecosystems should be welcomed. If these new systems gain a foothold, they could create competition for the dominant platforms, which would be healthy for the wider technology world and global users.

Huawei launched the latest version of its operating system, HarmonyOS 4.0, in early August. Yu Chengdong, Executive Director and CEO of Huawei's consumer business group, confirmed that HarmonyOS now has 700 million users across various platforms including smartphones, tablet computers, smart screens, and car cabins. The number of HarmonyOS developers has also exceeded 2.2 million.

Yu added that HarmonyOS 4.0 features an AI-powered voice assistant similar to ChatGPT. Xiang Ligang, Director-General of the Beijing-based Information Consumption Alliance, stated that initial estimates had projected a maximum of 350 million units using HarmonyOS. The current figure of 700 million suggests a much higher likelihood of the operating system's survival compared to earlier competitors to iOS and Android. Xiang also noted that in terms of AI-powered language model adaptation, HarmonyOS 4.0 surpasses both iOS and Android.

In late August, Huawei quietly launched its Harmony OS 4.0-based Mate 60 Pro handset, featuring Pangu AI. This is being promoted as the first smartphone with a satellite calling facility, showcasing the company's ability to innovate in challenging times. Huawei has not publicly disclosed details about the chipset used or whether the phone supports 5G. User reviews suggest that it offers a 'very fast' connection and may include a locally produced Kirin chipset. All these developments hint that Huawei's return to the global smartphone market could occur by the end of this year or early next year, although the company has not confirmed any details.

Recent data from Counterpoint Research indicates that Huawei saw a 58% year-on-year growth in smartphone sales in China in the second quarter of 2023, despite an overall decline among major manufacturers. This suggests a return to growth for the company. Independent research house Canalys reports that Huawei now holds a 10% share of the Chinese smartphone market. Reuters cited three research houses predicting that Huawei could produce 5G versions of its flagship models this year, with new launches likely in early 2024.

However, Huawei's re-entry into the 5G phone market depends on its semiconductor supplier SMIC, which is under US sanctions. SMIC is restricted to using simpler DUV machines from ASML, as it is barred from purchasing the latest EUV machines. With yields likely to be under 50% and increased production costs, it remains to be seen whether Huawei will indeed launch a 5G phone globally in 2024. If it does, a future HarmonyOS 5.0 version could potentially pave the way for Huawei's global comeback.

Karthik Ayyar of India's BharOS told Frontier Enterprise, "Since our initial announcement, we've received an overwhelming response from our government, strategic organisations, and device makers. BharOS is not just for India; it's for the entire world." He added that the OS is already seeing demand from outside India, although he did not specify which countries.

Haswell said, "State-backed operating systems, be they Chinese or otherwise, face significant challenges in gaining any foothold outside of their host jurisdiction and it would be unusual to see one succeed beyond where its use is encouraged or mandated by its host. However, the implications of the development of alternative operating systems are indeed good for the wider technology world. They are all good for encouraging competition and innovation, as OS creators learn from and compete with each other. Even if they are not likely to become dominant, they should be encouraged, because you never know who could be the next Android or iOS."

As we witness the incipient rise of independent operating systems like HarmonyOS, it's clear that the landscape of the technology world is evolving. These new systems, while facing significant challenges in gaining a foothold, represent a shift in the status quo. They have the potential to foster competition and innovation, pushing the boundaries of what's possible in the technology world. Whether or not these systems will become dominant players alongside Android and iOS remains to be seen, but their emergence now is a testament to the dynamic and innovative nature of the Asian software industry.

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