

## INNOVATION TRENDS IN ASEAN

### — LEADING COMPANIES AND GROWTH AREAS AS DECIPHERED FROM PATENT APPLICATIONS —

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#### SUMMARY

- ASEAN is emerging as one of the rapidly growing innovation markets. This report investigates the innovation trends in ASEAN, with a particular focus on Singapore, Indonesia, and Malaysia, by analyzing patent application filings.
- High-growth technology areas include healthcare informatics in Singapore, heterocyclic compounds for pharmaceutical applications such as anticancer drugs in Indonesia, and payment- and security-related data processing in Malaysia.
- ASEAN faces many challenges as it is lagging behind current trends when it comes to intellectual property (IP), with problems that include high distribution of counterfeit products and inadequate IP protection in some member countries. Strategic IP management is thus important when doing business in ASEAN countries.

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#### 1. SPOTLIGHT ON ASEAN

ASEAN is attracting attention as one of the fastest growing innovation markets. Singapore ranked 7<sup>th</sup> in the Global Innovation Index (GII) 2022<sup>1</sup> published by the World Intellectual Property Organization (WIPO), surpassing China and Japan, and illuminating the country's great capacity for innovation. The GI is an index that measures R&D investment, education, and market size to compare countries' innovation capabilities. In addition, all ASEAN member countries participate in the Regional Comprehensive Economic Partnership (RCEP) free trade agreement that came into effect on January 1, 2022, and new business opportunities are expected to emerge as a result of their participation in the vast market covered by the FTA. This report examines innovation trends in ASEAN by looking at filings of patent applications<sup>2</sup>.

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#### 2. INNOVATION TRENDS IN ASEAN

Figure 1 shows the number of patent applications filed in ASEAN countries from 2004 to 2022<sup>3</sup>. Singapore had the highest cumulative total during this period with 151,175 filings, followed by Indonesia with 118,683, Malaysia with 101,167, Thailand with 87,880, Vietnam with 76,839, and the Philippines with 40,537. For the purposes of comparison, in Japan, 228,615 patent applications were filed in 2020 alone.

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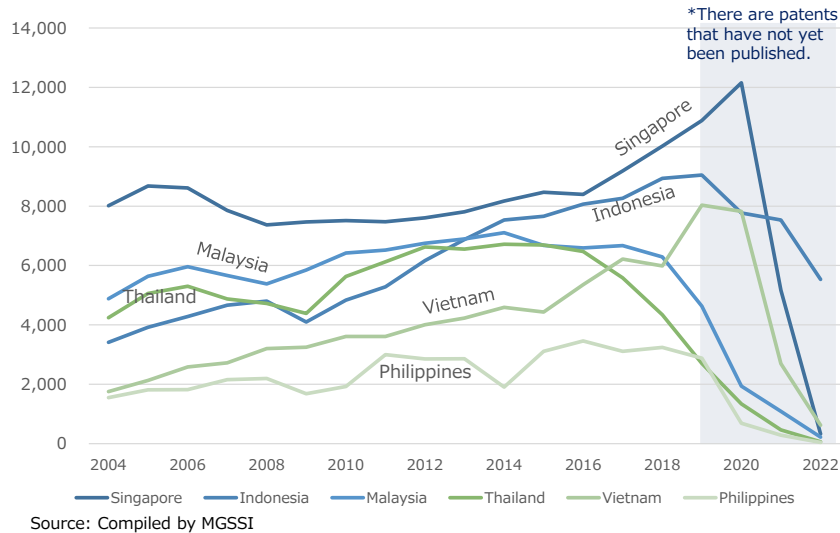
<sup>1</sup> [Global Innovation Index 2022: What is the future of innovation-driven growth? \(wipo.int\)](https://www.wipo.int/global_innovation_index/2022/en)

<sup>2</sup> The study was conducted using PatSnap Analytics, a global patent search and analysis tool provided by PatSnap. Date of search: March 9, 2023

<sup>3</sup> Cambodia, Brunei, Myanmar, and Laos could not be analyzed due to insufficient data.

When referring to Figure 1, it is important to take note of the incomplete data. As many countries follow the practice of publishing patents 18 months after the initial filing of the application, it is understandable that the filing volume declined from 2021, as shown on the right of the graph. In Figure 1, a rightward decline is seen for several countries before 2021, presumably due not only to a decrease in the number of applications, but also to delays in publication. As delays in patent publication in ASEAN are an issue, the RCEP agreement includes provisions for transparency in the area of industrial property rights, requiring the prompt disclosure of information after 18 months have passed from the date of filing. Next, this report provides individual analyses of the ASEAN countries with the highest number of patent applications: Singapore, Indonesia, and Malaysia<sup>4</sup>.

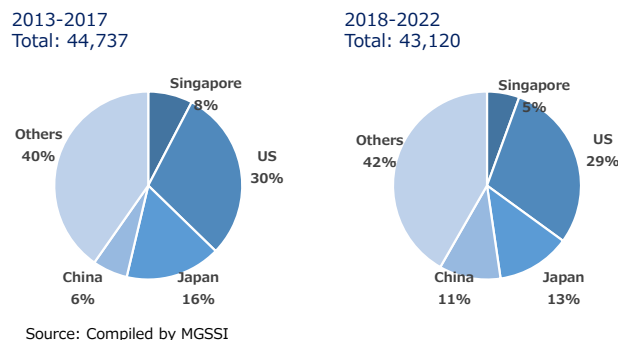
Figure 1. Patent Applications in ASEAN Countries (2004-2012)



## 2-1. Innovation trends in Singapore

For this report, patent applications in Singapore were grouped into two five-year periods, 2013 to 2017 and 2018 to 2022, and the breakdown of applicants by country was examined for each period (Figure 2). In both periods, US applicants accounted for the highest percentage of patent filings, or approximately 30% of the total. China's growing share is consistent with the trend of an increasing number of Chinese companies establishing regional headquarters and R&D centers in Singapore. The number of applications from within Singapore is not large, however, at approximately 5% for the most recent five-year period.

Figure 2. Patent applications in Singapore  
«Breakdown by country»



Foreign companies have filed a number of patent technologies related to wireless communications, data processing, and semiconductors in Singapore (Figure 3). Qualcomm (US) and Huawei (China) hold standard-essential patents (SEPs) on wireless communication technologies such as 5G, and are believed to be filing patent applications to secure patent licensing deals with Singapore Telecommunications (Singtel), a local telecommunications operator, and others.

<sup>4</sup> Individual trends could not be analyzed for Thailand due to insufficient data.

**Figure 3: Patent applications in Singapore (top applicants in 2018-2022)**

Rank	Applicant	No. of filings	Main technologies
1	Qualcomm (US)	893	Wireless communications
2	Advanced New Technologies (UK)	606	Data processing (payments, security)
3	A*STAR (Singapore)	466	Materials analysis, genetic engineering
4	National University of Singapore (Singapore)	442	Genetic engineering, pharmaceutical formulation
5	Samsung Electronics (South Korea)	410	Semiconductors, memory devices
6	Disco (Japan)	409	Semiconductor equipment, precision tools
7	Huawei Technologies (China)	287	Video encoding, wireless communications
8	Applied Materials (US)	286	Semiconductor manufacturing, sputtering equipment
9	Alibaba Group (China)	278	Data processing (payments, security)
10	Visa International Service (US)	263	Data processing (payments, security)

Source: Compiled by MGSSI

Of patent applicants for technologies related to electronic payments and transactions using blockchain and cryptography, three companies are ranked among the leading patent filers. Singapore is probably the country of choice for companies applying for patents in this field because of the popularity of cashless payments.

As for the three leading companies applying for patents on semiconductor-related technologies, all of them have bases in Singapore. The significance of these companies holding patents in Singapore is to ensure the implementation of their technologies in Singapore and also to prevent patent infringement by other companies.

Among the top applicants are a Singaporean research institute as well as a local university. Both have filed many patent applications related to genetic engineering. Singapore has a large number of biopharmaceutical-related manufacturing plants and R&D centers, and the government's efforts to develop the biomedical sector into a central pillar of its economy are fueling interest in this field.

In recent years in Singapore, ICT-related technologies have ranked first among high-growth technology fields, evidenced by the high rate of growth in patent applications (Figure 4), and patent applications related to healthcare informatics in particular are increasing. A leading applicant in this field is Ping An Technology (China).

**Figure 4. Patent applications in Singapore (high-growth technology fields)**

Rank	Leading technology field	Secondary technology field
1	Information and communications technology (ICT)	Healthcare informatics
2	Games, entertainment	Entertainment devices, video games
3	Genetic engineering	Recombinant DNA technology

Source: Compiled by MGSSI

The second fastest-growing technology field is that for games and entertainment-related technologies. Growth in this field was boosted by an increase in patent applications for amusement equipment, particularly in the realm of play and ride equipment in amusement parks by Universal City Studios (US), which operates Universal Studios Singapore, and applications related to video games by Tencent Technology (Shenzhen)(China).

The third is the genetic engineering field, where patent applications from the US and China are on the rise. As mentioned above, Singaporean research institutes and universities are also active in this field and are on an equal footing with other patent applicants.

## 2-2. Innovation trends in Indonesia

Indonesia, Japan, and the US account for a large share of patent applications in Indonesia, but the number of applications from each of the three countries has declined in the last five years (2018-2022) (Figure 5). In the "Others" category, a large portion of patent applications is attributable to Germany, Switzerland, the Netherlands,

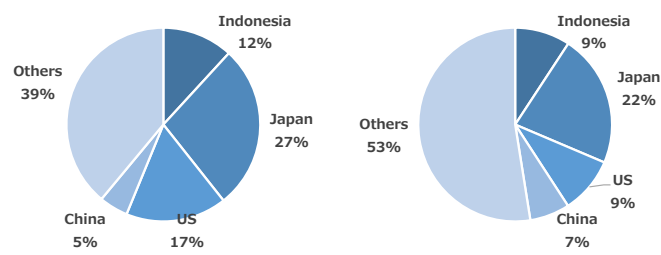
and South Korea. The trend of increasing patent applications from China and South Korea appears to be related to the expansion of the two countries' respective economic relations with Indonesia.

**Figure 5. Patent applications in Indonesia**

«Breakdown by country»

2013-2017  
Total: 40,342

2018-2022  
Total: 41,592



Source: Compiled by MGSSI

The top patent applicants in Indonesia include several companies that hold standard-essential patents (SEPs) related to wireless communication technology, as is the case in Singapore, and Japanese companies with a base in Indonesia (Figure 6). Indonesia is the largest consumer market in ASEAN, and it is interesting to note that consumer goods companies Unilever and Kao are included in the list of leading patent applicants. Unilever makes toothpaste and soap in Indonesia, while Kao produces diapers, detergents, and other consumer goods in the country, and the patents applied correspond to these products.

**Figure 6: Patent applications in Indonesia (top applicants in 2018-2022)**

Rank	Applicant	No. of filings	Main technologies
1	Qualcomm (US)	1,336	Wireless communications
2	Honda Motor (Japan)	754	Vehicles (two-wheelers)
3	Huawei Technologies (China)	649	Wireless communications
4	Toyota Motor (Japan)	589	Batteries, vehicles (automotive)
5	Unilever IP Holdings (Netherlands)	558	Cosmetics, cleansing agent compositions
6	Samsung Electronics (South Korea)	532	Information processing, semiconductors
7	Nippon Steel (Japan)	523	Alloys, thermal treatment
8	JFE Steel (Japan)	463	Alloys, thermal treatment
9	Kao (Japan)	415	Absorbents, cleansing agent compositions
10	Advanced New Technologies (UK)	411	Information processing, telecommunications

Source: Compiled by MGSSI

Organic chemistry is the No. 1 growth technology field in Indonesia (Figure 7), and patent applications related to heterocyclic compounds<sup>5</sup> are increasing, especially for pharmaceutical applications such as anticancer drugs. The US, Germany, China, Switzerland, and Japan have filed the most applications in this field, in that order.

**Figure 7. Patent applications in Indonesia (high-growth technology fields)**

Rank	Leading technology field	Secondary technology field
1	Organic chemistry	Heterocyclic compounds
2	Tobacco	E-cigarettes
3	Genetic engineering	Recombinant DNA technology

Source: Compiled by MGSSI

Tobacco-related technology is the second-fastest growing technology area, and that segment has seen an increase in patent applications, especially those related to e-cigarettes. A leading applicant in this field is Nicoventures Trading (UK).

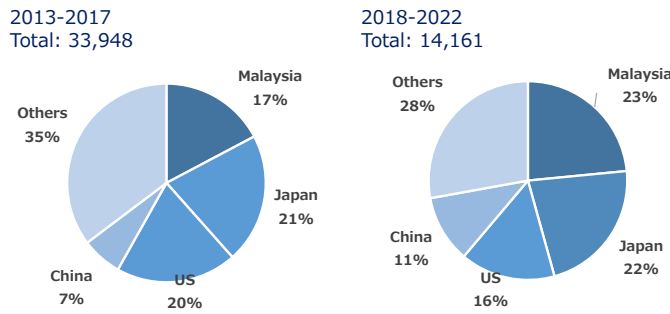
In genetic engineering, which is the third-biggest growth field, patent applications by Chinese pharmaceutical companies are increasing, while Japanese and US pharmaceutical companies are also filing many applications.

<sup>5</sup> Heterocyclic compounds have several different atoms bonded in a ring shape, and possess various properties. The compounds are widely studied in the fields of organic chemistry, pharmaceutical chemistry, agrochemical chemistry, and materials chemistry.

**2-3. Innovation trends in Malaysia**

In Malaysia, the percentage of patent application filings by domestic companies is higher than in other ASEAN countries (Figure 8). Of applications by foreign entities, Japan accounts for the largest share at just over 20%. China has been increasing its share in recent years. It is assumed that the low number of total applications in the five-year period from 2018 to 2022, which was about half of the total number of applications in the previous five-year period from 2013 to 2017, is due in part to incomplete data.

**Figure 8. Patent applications in Malaysia**  
«Breakdown by country»



Source: Compiled by MGSSI

Several Malaysian companies, universities, and research institutions rank among the top patent applicants (Figure 9). Top Glove International, ranked 7<sup>th</sup> among patent applicants in Malaysia, is a major rubber glove manufacturer. Along with a sharp increase in its earnings owing to special demand related to the COVID-19 pandemic, the company has been filing an increasing number of patent applications.

**Figure 9: Patent applications in Malaysia (top applicants in 2018-2022)**

Rank	Applicant	No. of filings	Main technologies
1	Daihatsu Motor (Japan)	383	Vehicles (four-wheelers)
2	Disco (Japan)	295	Semiconductor equipment
3	Mimos Berhad (Malaysia)	187	Data processing
4	Toyota Motor (Japan)	187	Vehicles (four-wheelers), batteries
5	Alibaba Group (China)	169	Data processing (payments, security)
6	University Putra Malaysia (Malaysia)	127	Materials analysis
7	Top Glove International (Malaysia)	124	Gloves
8	Huawei Technologies (China)	124	Wireless communications
9	University of Technology Malaysia (Malaysia)	114	— <sup>Note</sup>
10	Intel (US)	109	Semiconductor equipment

Note: The "main technologies" could not be specified because patent applications are not concentrated in specific technology fields.

Source: Compiled by MGSSI

Daihatsu Motor (Japan), the leading patent applicant in Malaysia, has been operating Perodua Manufacturing (PMSB) as the second national car company in the country since 1994. Perodua has held the top share of vehicle sales in Malaysia for 17 consecutive years, from 2006 to 2022.

Unique to Malaysia is the fact that Qualcomm (US), which is the leading patent applicant in both Singapore and Indonesia, is not included among the leading applicants, and that there are no top patent applicants for wireless communication technology in Malaysia, unlike its two neighbors. It can be assumed that foreign telecommunications carriers are hesitant to invest in Malaysia because the country has a policy of prioritizing government-led infrastructure construction for next-generation telecommunications, including 5G networks, over private-sector initiatives.

Meanwhile, the No. 1 high-growth technology area in Malaysia is data processing (Figure 10), and the country is seeing a particularly strong increase in applications for patents related to payments and security. In this field, the most applications were filed by Alibaba (China), which also ranks among the leading companies in terms of overall applications in Malaysia, and it is followed by Advanced New Technologies (UK) and Coupang (South Korea).

**Figure 10. Patent applications in Malaysia (high-growth technology fields)**

Rank	Leading technology field	Secondary technology field
1	Data processing	Payments, security
2	Organic polymer compounds	Use as an additive
3	Plastics processing	Specific molding techniques

Source: Compiled by MGSSI

The second fastest-growing technology area is that for organic polymer compounds, and patent applications in this field are increasing, especially related to the use of such compounds as additives for rubber compositions and resins. In both this field and the plastics processing segment, which is the third-fastest growing technology area, patent applications by tire manufacturers are conspicuous. This trend can be associated with the fact that there are many tire manufacturing plants in Malaysia. In addition to tire manufacturers, Top Glove International, for example, has also applied for patents in these two technology fields.

### 3. CONCLUSION: INTELLECTUAL PROPERTY IN ASEAN

The majority of patent applications in ASEAN countries are from non-ASEAN member countries. Given the cost of filing and the obligation to exercise the right granted by a patent, it can be assumed that the applications are basically for innovations to be implemented locally, which shows a close relationship with business. It can be inferred that companies engaged in businesses without goods, such as wireless communications and payment services, may file patent applications in countries where they do not provide services, while companies that supply goods, such as automobiles and consumer goods, tend to actively file patent applications in countries where they produce their own products.

ASEAN faces many challenges as a region that is behind the curve when it comes to intellectual property (IP). Problems include the high distribution of counterfeit products, insufficient IP protection in some member countries<sup>6</sup>, delays in examinations, and lack of standardized examinations. In addition, efforts are focused on the enforcement of trademarks and copyrights<sup>7</sup>, while less attention is given to the enforcement of patent rights. When developing business in ASEAN, therefore, it is necessary to conduct appropriate risk management, and that includes looking into and obtaining types of IP other than patents.

<sup>6</sup> In Myanmar, for example, a patent law was passed in 2019 but has not yet come into effect.

<sup>7</sup> To prevent infringement through various assistance measures and monitoring of the entire procedure overall.