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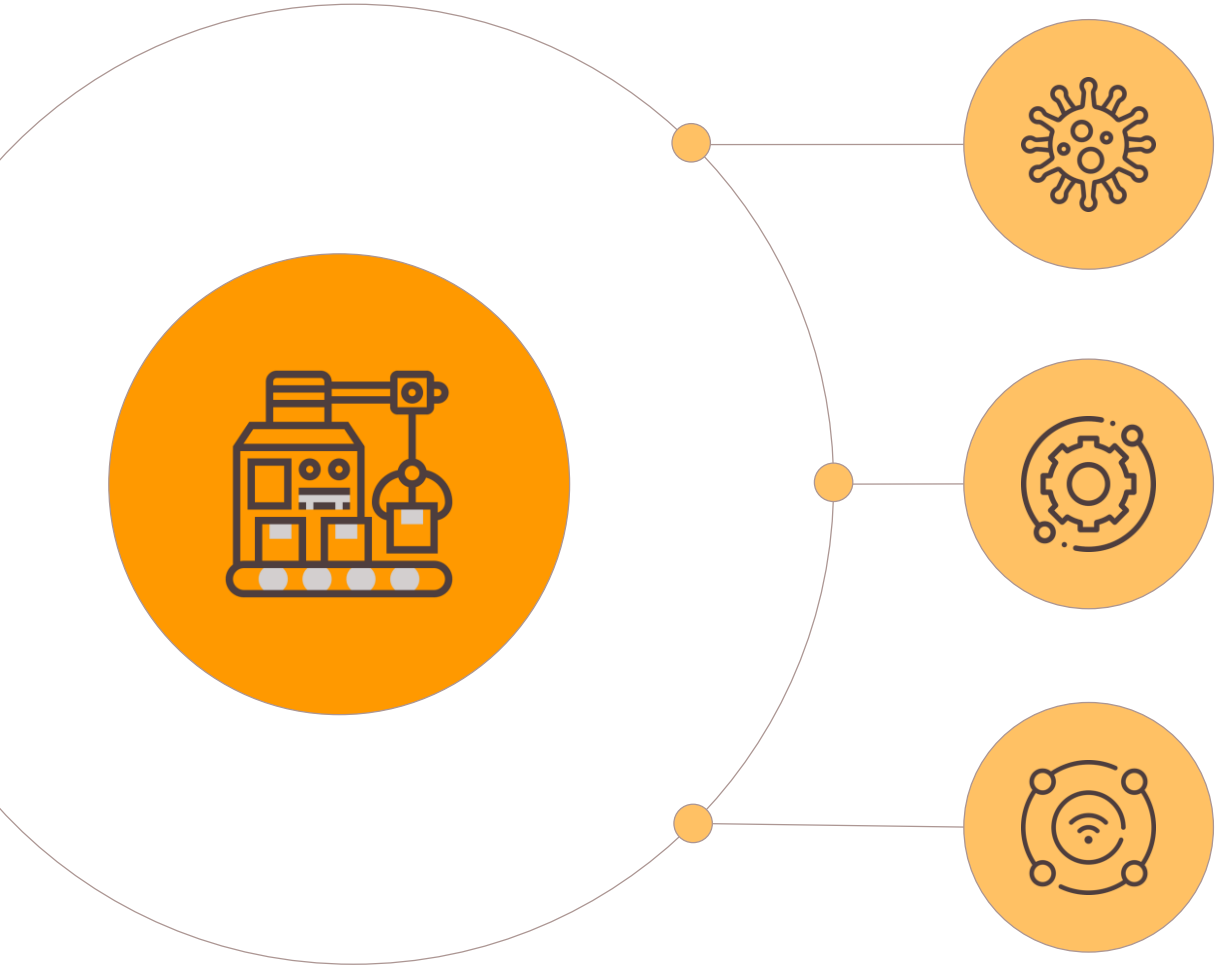


INDUSTRY HORIZON

July 2020

Krungsri Research

REOPEN WITH CARE



STEPS TOWARDS REOPENING

- Reopening will require changes to work, commercial, and social life

LIFE AFTER LIFTING LOCKDOWN

- Identify industries that are most difficult to restart and quick start industries

RESPONSE TO REOPENING

- Solutions for businesses to restart

Steps towards full-fledged reopening

REOPENING PROCESS

FULL LOCKDOWN ORDERS

- Activate National State of Emergency
- Residents ordered to stay home, announce night curfew
- Close non-essential businesses and services (including schools)
- Cancel mass gatherings and close public venues
- Restrict inbound, outbound, and domestic travel
- Government approves relief measures to help workers and businesses suffering from the impact of a full lockdown

PARTIAL RELAXATION OF LOCKDOWN ORDERS

- Use contact tracing technologies, Thai Chana
- Reduce night curfew hours and relax domestic travel restrictions
- Reopen some public venues subject to restrictions in 4 phases (from 3 May – 15 June)
- Zero new COVID-19 cases and no local transmission cases since 25 May
- Government is efficient in detecting new cases, efficient public communication program

LOCKDOWN ORDERS END

- End night curfew
- Zero new confirmed cases and no local transmission
- No deaths, confirming strong capacity to detect new cases, risk assessment, case investigation, laboratory diagnosis, clinical management, infection prevention and control
- Reopen all public venues subject to restricted hours (until midnight)
- Continue to restrict international travel, exception for 11 categories of people to enter Thailand by air

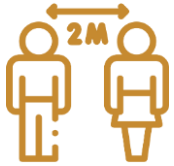
Source: World Health Organization (WHO), The Centre for COVID-19 Situation Administration (CCSA), Krungsri Research

Relaxing lockdown measures in phases

	Phase 1 (3 May)	Phase 2 (17 May)	Phase 3 (1 June)	Phase 4 (15 June)	Phase 5 (1 Jul)
Curfew	Curfew time 10 p.m. - 4.00 a.m.	Curfew time 11 p.m. - 4.00 a.m.	Curfew time 11 p.m. - 3.00 a.m.	End night curfew	
Markets	Fresh markets, Flea markets, Floating markets, Community markets, Walking streets, and Roadside stalls				
Eateries	Small food, beverage, dessert and ice cream shops outside department stores, street food stalls, and food hawkers	Restaurants, food courts, cafeterias and eateries in office buildings	Group dining out	• Alcohol can be served at restaurants and eateries • Buffets can reopen with restrictions	
Retail & wholesale	Supermarkets, eating areas in convenience stores, vehicles hawking goods, small retail outlets, community retail outlets	Community and shopping malls, retail and wholesale shops	Extend opening time of malls and department stores to 9 pm.		Extend opening time of malls and department stores to midnight and convenient stores can operate 24 hours a day
Education			Schools (for admission examinations/short training), private tuition (vocational, arts and sports), child daycare centres (restricted activities)	International and tutorial schools, seminars and training, nurseries and elderly care centres (for daily services) and scientific centres for education	Reopen all schools
Beauty	Barbers and hairdressers (only cutting, washing and drying)	Beauty salons (hair-curling, dyeing services, manicure, and pedicure)	Beauty clinics and salons and tattoo and piercing parlors		
Sports & recreation	Public parks, outdoor sports facilities such as tennis, shooting, archery, cycling, golf, and training grounds.	Outdoor stadiums for team sports Botanical gardens, museums, galleries, public libraries	Fitness clubs, stadiums (football, futsal, basketball and volleyball), bowling/ skating, ponds for sports and recreational activities	Sports and concert stadiums, fields, gym, theme parks, water park, playgrounds, musical performances, national parks and arboretums	
Other	Pet grooming shops, pet boarding shops.	Beauty/ weight-loss clinics, meetings, television program/ advertisement/photo shoots, Thai foot massage parlors	Buddha amulet markets, theatres (max 200), health-oriented massage parlors, zoos, ballroom dancing venues, exhibition and convention (max 20,000 sqm.	Meeting rooms (more than 200 pax), pubs, bars, karaoke bars and similar services, massage parlors, beaches, public transport, health-oriented spas and saunas	Pubs, bars, karaoke centres (until midnight), game shops and internet café, massage parlors and teahouses

Source: CCSA, Krungsri Research

Reopening will require changes to work, commercial, and social life



General

- Wider use of masks
- Frequent hand-washing, disinfecting, and deep cleaning
- Maintain physical distancing measures
- Limit allowable capacity
- Stagger shifts for employees
- Temperature checks
- Create one-way flow
- Increase ventilation
- On-site testing



Manufacturing

- Provide safety equipment
- Stagger lunch and other breaks
- Contactless delivery of supplies
- Redraw factory floor plans



Services

- No spectators at sporting events
- Protective barriers during face-to-face interactions
- Disposable menus and silverware at restaurants
- Single occupancy in dormitories
- Appointments required
- No waiting rooms or restrooms

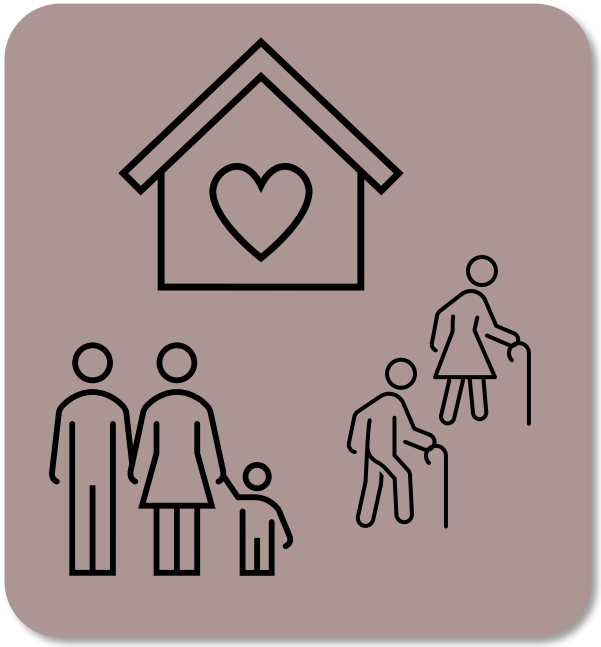


Offices

- Protective barriers that divide desks
- Disposable placemats for desks
- Automatic doors, attendants that open doors
- Video calls instead of travel for business meetings
- Limit capacity in elevators
- Work from home if possible
- Reorganize office seating
- Avoid buffet-style cafeterias

Source: Goldman Sachs

A change in behaviour after lockdown



Safety measures during reopening

1) Self-hygiene and protection
2) Contact tracing technologies (Thai Chana or government big data system)
3) Elderly try to avoid going out unnecessarily and reduce time in public areas
4) Cashless transactions
5) Limit large gatherings in closed venues (concerts, movies, sport games)
6) Limit use of public transportation, restaurants, unless protective barriers are in place
7) Greater demand for home delivery services, e.g. food, tele-medicine, online entertainment, online shopping
8) Spend more time online
9) Employ technology and data to identify risk areas, and systems for people to conduct self-checks



Services

Safety measures while reopening

1) Contact tracing technologies (Thai Chana, or government big data system)
2) International travel restrictions. International meetings and conferences are held online
3) Stagger shift for employees (3-4 shifts per day at different times), stagger lunch breaks, and safety equipment
4) Bi-lateral collaboration with countries that have the same response and quarantine levels
5) More business collaborations – complement and substitute gaps in businesses



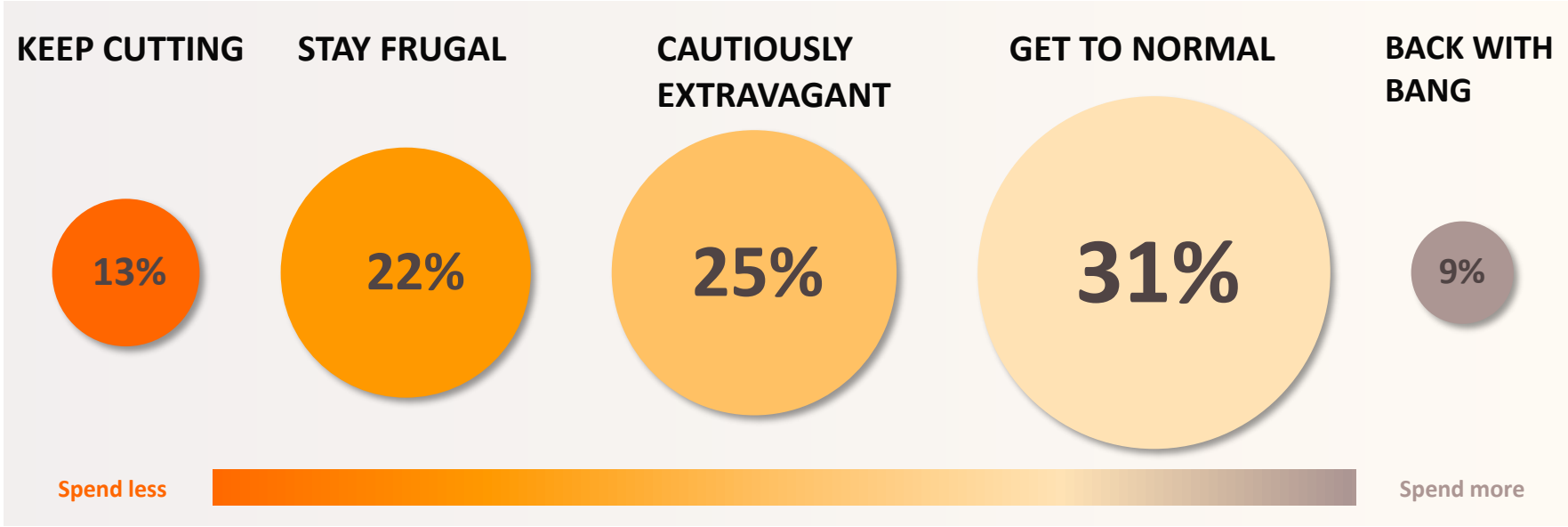
Offices

Source: Krungsri Research

Consumers are cautious, but they are ready to spend

EY conducted a survey to track emerging consumer behavior and sentiment across key five markets [1/]. There are five very different consumer segments as the crisis abates. "Cautiously extravagant" consumers (25% share) are financially conservative but expect to increase spending in non-essentials once the crisis is over. "Get to normal" consumers (31%) are determined to resume normal life as soon as possible. "Back with bang" consumers (9%) are younger and working. Although their daily lives had been disrupted the most, they are the most optimistic and spending much more in all categories. Only a third of consumers – "Stay frugal" (22%) and "Keep cutting" (13%) – expect to spend less.

Five consumer segments will appear after the COVID-19 crisis

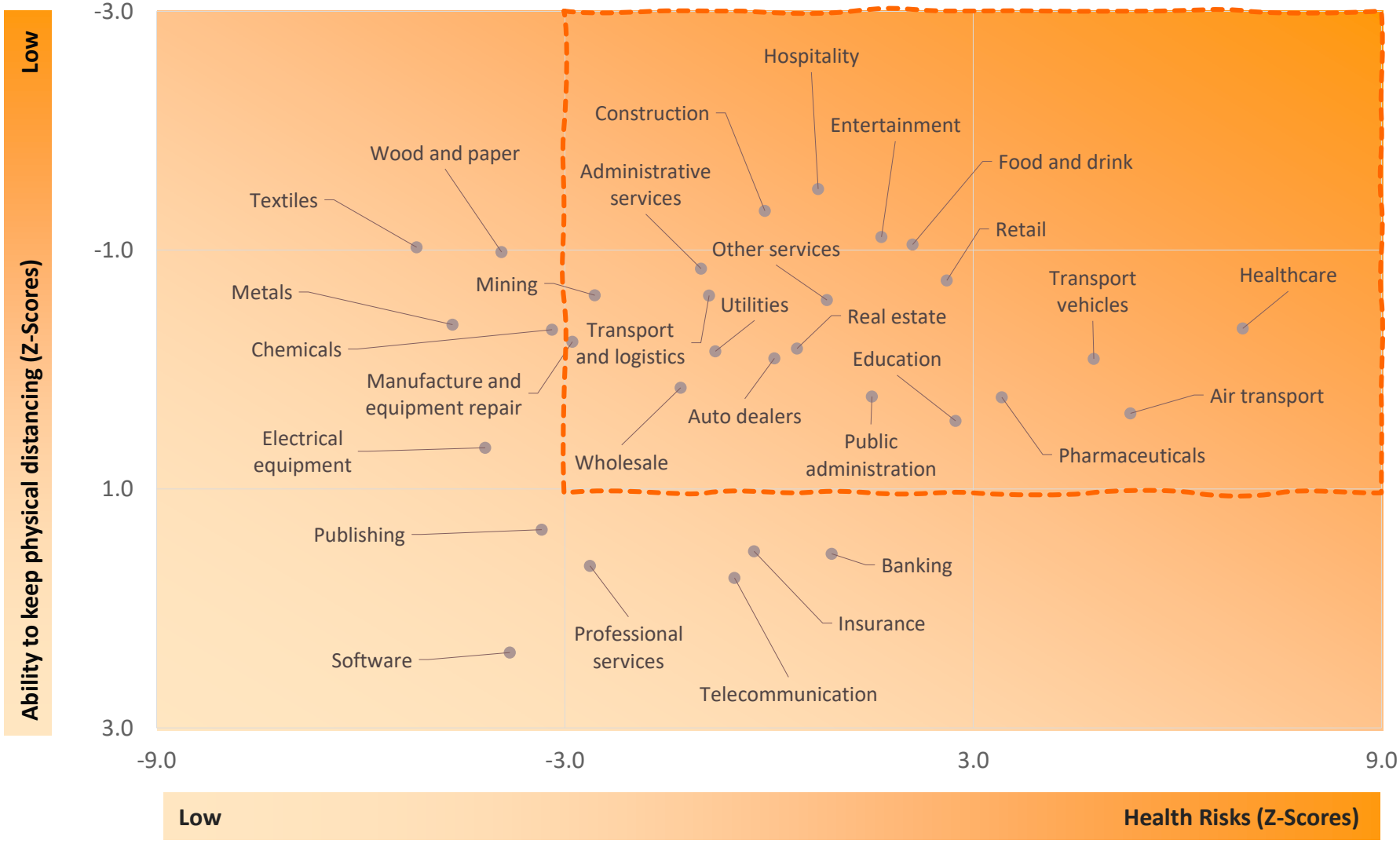


KEEP CUTTING	STAY FRUGAL	CAUTIOUSLY EXTRAVAGANT	GET TO NORMAL	BACK WITH BANG
• Least educated • Likely to lose job • Make deep spending cuts • Change what they buy and how • Worries about the pandemic	• Spend slightly less, but some deep cuts • Among the most pessimistic about the future	• Middle- to high-income • Relatively optimistic • Will spend more in areas important to them	• High income • Spending largely unchanged • Daily lives were little affected • Least concerned about the pandemic	• Younger and working • Spend much more in all categories • Daily lives were disrupted the most • Most optimistic

Note: [1/] EY surveyed 4,859 consumers across the US, Canada, UK, France and Germany during the week of 6 April 2020. The survey questionnaire covered current behaviors, sentiment and intent.

Source: EY, Krungsri Research

Hardest Hit, Slow Start and Quick Start sectors



Note: Based on occupational survey data by US BLS, health risk are ranked b average score: (i) whether workers have to be in close physical proximity, (ii) whether they have to be in constant contact with others, and (iii) how often they are exposed to diseases or infections.

Source: U.S. Bureau of Labor Statistics (BLS), McKinsey, Goldman Sachs, Visual Capitalist, Krungsri Research

Businesses or events that involve large gatherings in enclosed spaces will be hardest hit

The health risks associated with reopening will differ across industries, depending on the extent workers can engage in distancing with minimal loss of output. The least risky industries include software, manufacturing, telecommunication, professional services, banking, insurance, and agriculture. Food manufacturing is riskiest among the manufacturing sub-sectors. The riskiest industries are air transportation, healthcare, education, arts and entertainment, accommodation, and food services.

Hardest Hit

High health risks and low ability to keep physical distancing

- Air transportation
- Transport vehicles
- Healthcare
- Pharmaceuticals
- Hospitality
- Construction
- Entertainment
- Food & Beverage

Slow Start

High health risks but high ability to keep physical distancing

- Administrative services
- Retail trade
- Mining
- Transportation and logistics
- Other services
- Manufacturing and equipment repair
- Real estate
- Utilities
- Auto dealers
- Wholesale trade
- Public administration
- Education

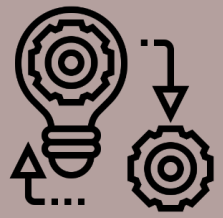
Quick Start

Low health risks and high ability to keep physical distancing

- Textiles
- Wood and paper
- Metals
- Chemicals
- Electrical equipment
- Publishing
- Insurance
- Banking
- Professional services
- Telecommunication
- Software

Source: U.S. BLS, McKinsey, Goldman Sachs, Visual Capitalist, Krungsri Research

Strategic response to reduce reopening risks



Businesses adapt to *new normal*

- Adapt business to *new normal* to address immediate challenges and minimize impact
- Hardest Hit industries need to identify/offer substitute products and services



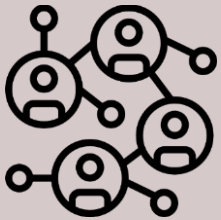
Collaboration

- Bring goods and services to stakeholders, and join forces for mutual benefit



B2C

- Move from B2B to B2C
- Increase customer engagement by responding to *new normal* customer behavior with "New customer experiences"



Bridging digital and *new normal*

- Greater investment in new emerging businesses including Automation, AI, e-commerce, digital commerce, digital transformation, blockchain

Source: Krungsri Research

Solutions for Hardest Hit industries – effective vaccine, digital tools, and substitute products/services

For any industry to recover, individuals need to feel safe and confident that they are protected from the virus. A scalable vaccine is the most effective solution while reopening, but that will not be available so soon. Technology can help make society more resilient during a pandemic and other threats, while helping businesses to stay open or resume operations. There are 10 emerging technology trends, including digital payment, telehealth and robotics. In the absence of a scalable vaccine and digital tools, businesses need to find ways to substitute their offering with products or services that allow greater ability to work remotely and reduce health risks.

Most effective  Vaccine

Digital tools

 Online shopping and robotic deliveries

 Digital and contactless payments

 Robotics and Drones



Online entertainment

 3D Printing



5G and ICT Supply Chain 4.0

 E-learning

 Tele-working

 Tele-health

 Supply chain 4.0

Substitution

 Service reform

 Value redesign

Source: World Economic Forum (WEF), Krungsri Research

In the absence of a vaccine or scalable treatment, reopening will have to remain gradual and prudent

The race to develop a COVID-19 vaccine

Overseas: Leading global companies are forming joint ventures to develop a vaccine

- The WHO released a list of 70 companies that are developing COVID-19 vaccines, 3 of which are in the first stage of human trials. (i) Moderna, a US company, is conducting initial trials on infected male and female patients. (ii) China's CanSino Biologics is jointly developing a vaccine with the Beijing Institute of Biotechnology and the Academy of Military Medical Sciences. They are currently taking Ebola-candidate vaccine to stage 2 trials. (iii) The US's Inovio Pharmaceuticals is working with 4 companies from China, the UK and Germany to develop a vaccine.
- American giant Johnson & Johnson is investing over USD1bn in a joint-venture with the US Biomedical Advanced Research and Development Authority (BARDA) to develop a vaccine. The company hopes to produce 600-900 million doses in the first quarter of 2021 and subsequently, over a billion doses per year.
- GlaxoSmithKline (UK) and Sanofi (France) have ceased clinical trials of all other medicines to concentrate on jointly-developing a COVID-19 vaccine. They hope to start clinical trials in the second half of the year. If the trials are successful, they plan to distribute 600 million doses of the vaccine in the first half of 2021.
- Fujifilm plans to ramp up production of *Avigan* (used to treat COVID-19). By the end of July 2020, it hopes to produce enough to treat 100,000 patients per month (or 2.5-fold increase over March production), and 300,000 patients per month thereafter

Thailand: Production of a vaccine for widespread use possibly in 1-2 years

- The National Vaccine Institute (NVI) is working with foreign researchers to test a vaccine in Thailand, working with China to conduct stage-2 trials. They are developing a model vaccine that is currently being tested on animals, before human trials start in October. If successful, they could start commercial production in mid-2021.
  - The Faculty of Medicine at Chulalongkorn University and Bionet-Asia is currently investigating immunity in test animals which have been injected twice with a potential vaccine.
  - Researchers at the Faculty of Medicine at Siriraj Hospital, Mahidol University and the Faculty of Medicine at Chulalongkorn University are currently reproducing the COVID-19 virus to be sterilized and injected into test animals.

Source: Krungsri Research

Risky industries can reopen safely with digital tools

Sectors	
Healthcare	✓ ✓ ✓ ✓ ✓
Air transport	✓ ✓ ✓ ✓ ✓ ✓ ✓
Transport vehicles	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Pharmaceuticals	✓ ✓
Hospitality	✓ ✓ ✓ ✓ ✓ ✓
Entertainment	✓ ✓ ✓ ✓ ✓ ✓ ✓
Food and drink	✓ ✓ ✓ ✓ ✓ ✓
Retail trade	✓ ✓ ✓ ✓ ✓
Wholesale trade	✓ ✓ ✓ ✓ ✓ ✓
Education	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Real estate	✓ ✓ ✓ ✓
Transport and logistics	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
Auto dealers	✓ ✓
Construction	✓ ✓

Source: Krungsri Research

Essential to seek substitute products and services

Service reform

- **The Hardest Hit** sector needs to find substitute products and services that allows the ability to work remotely and reduce health risks and collaborate with "tech" platforms which have strong traffic. For example, movies and concerts can be substituted with content delivered via *Netflix* or *Facebook Live*. They also need to collaborate with e-marketplaces while scaling down off-line stores to reduce rental expenses.
- **A direct substitute** (moving to an identical competitor) is not a good option because those businesses would also be affected. Therefore, the focus would be on indirect substitutes (something different to achieve the same goal) that can respond to *new normal* consumer behavior.

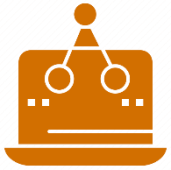
Hardest hit sectors	Sub-sectors	Substitution
• Entertainments	• Movie theatres, concerts	• Movie/ Music streaming, audiobooks, podcasts through smartphones
• Travel & Leisure	• Mass tourism, cruise ships	• Health & wellness tourism programs to serve high-end tourists

Value redesign

The change in consumer behavior since the pandemic will trigger a structural shift in purchasing decisions and lifestyles. For example, the lockdown had prompted businesses to look for substitute products and services and "value redesign" to keep the businesses afloat.



Design new services/products to meet changing behavior



Shift services/ products to virtual platform



Bundle services with business partners and redesign the service line (and serve new customers)



Use data analytics to manage inventory and supply chains



Use technology to redesign work processes and operations

Source: Krungsri Research

Top 10 trends: Biggest influence on businesses in Thailand

Top 10 *New Normal* in Thailand

Poll of 300 CEOs in Thailand by *Future Platform*

Teaching and Learning 2.0 Employ new technology, self-inquiry of knowledge or peer learning	**Online stores (e-commerce)** Collapse of some vendors and turn to online stores	**Telepresence** Virtual meeting and conference, virtual doctor's examination	**A culture of preparation** Business Continuity Plan will be the new normal for every business	**Collapse of the world economy** And maybe rise of bi-lateral collaborative economies
Industrial Revolution 4.0 Employ Robotics, AI, Internet of Things, Biotechnology, Big data in production lines and many industries for the "real deal of Industry 4.0"	**Platform economy** Platform such as *Facebook, WhatsApp, LinkedIn, Alibaba, Shopee, Lazada,* and *Amazon* will play more active roles in new consumer behavior. Engagement with the platform economy is important.	**Nature and food as remedies** Rising health awareness, with a focus on wellness and natural food remedies. People will exhibit more "health seeking behavior"	**Retail in brick and mortar stores** Offline stores will still need physical store to showcase products. The trending keyword is "Omni-channel"	**Geopolitical impact** Bipolar politics between US and China will be more controversial. The new world order will split countries into geopolitical blocks

Source: Future Platform, Krungsri Research

Healthcare: Towards a digital health ecosystem

Digital solutions

- Telemedicine and teleconsultation
- Remote patient monitoring (RPM)
- Healthcare applications, for example a commercial bank could develop an application that can host a healthcare ecosystem. This can be used to promote healthcare products and services by partnering with players in the healthcare sector to provide health advice (e.g. hospitals, pharmacies), related products (e.g. health foods, fitness centers, beauty clinics), and delivery platforms.
- Remote surgery and remote emergency rescue
- Smart robots may be able to operate alongside medical staff, for example to deliver food and medicine, and to reduce staff workload, exposure to COVID-19, and the need for PPE.
- In China, smart devices are being developed to help check and monitor infections, for example, the use of 5G thermal imaging equipment that are linked to environmental data algorithms can identify and track at-risk individuals.
- CT scans are being used in China to detect COVID-19 infection
- In Taiwan, virtual reality applications have been developed to train doctors to treat COVID-19 patients so that they do not need to come into contact with real patients.

Substitution

- Hotels and resorts are being remodeled as care homes.
- AI booths are able to diagnose and prescribe medication within one minute (e.g. *Ping An Good Doctor* app).

New Normal

- Operators are developing connected networking platforms with the help of digital technology (robotics, IoT, AI and big data) and building partnerships with other businesses (real estate, IT, services and insurance).

Source: Krungsri Research

Meeting challenges by developing new service offerings

Hospital	New services
Praram 9	• Use telemedicine to treat patients with chronic illness through the *Doctor Anywhere* app (the hospital is currently developing its own app). • Offer drive-in service at a special site for those who require blood tests or vaccination but not full hospital services. • Offer home-based blood tests and injections for patients in the BMR. • Run screening service outside the main hospital to divert high-risk patients to an ARI clinic, to minimize exposure to the general hospital population.
Bumrungrad International	• Established a special clinic to reduce risk of cross-infection within the hospital grounds. • Offers a '60-second service' which aims to complete processing within 60 seconds following the completion of consultation and writing of prescription. • Bumrungrad Health Residence service provides accommodation and care for patients who wish to distance themselves from their families or need time for recovery. • Offers home-based care at a standard equivalent to that received by in-patients. • Teleconsultation service for long-distance consultations (available from March this year). • Remote patient monitoring (RPM) allows for long-distance care of patients with arrhythmic heart condition.
Synphaet Ramintra	• COVID-19 drive-through testing • Telemedicine
Kasemrad	• Telemedicine • Home healthcare

Source: Krungsri Research

Developing new services while reducing investment in new hospitals

Hospital	New services
Bangkok	• Teleconsulting and telehealth • Screens incoming patients, sending patients with breathing difficulties straight to an ARI clinic and other patients to a non-ARI clinic • Uses a camera- and microphone-equipped *health bot* to communicate with patients who need check-ups as well as screening for infection • Partners with other businesses, including insurers to reimburse insured patients for the cost of telehealth consultation • Runs a service that allows medical staff to carry out procedures such as drawing blood and injecting vaccines at patients' home
Samitivej	• Offers a 'virtual hospital' service
Ramkhamhaeng	• Drive-through testing for COVID-19
Phyathai	• *Clinic Connect* offers 3 services – telemedicine, blood testing and deliver prescriptions within 2-3 working days.

- Bangkok Hospital believes that to meet rising demand for healthcare services, **hospitals do not need to expand physical facilities and infrastructure**, because they are both expensive and unnecessary following changes in consumer behavior since the the COVID-19 crisis. Instead, **Bangkok Hospital plans to build a remote hospital to provide telemedicine services/home-based care, adopting the new direction in healthcare services.**
- Thonburi Hospital has **scaled back investment in new hospitals** in Thailand and abroad because the management believes the COVID-19 pandemic will expand the domestic market.

Source: Krungsri Research

Air transportation: Raising public health standards and seamless travel trends

Digital solutions

- **Contactless travel:** This involves contactless fingerprinting, iris and face recognition, gesture control, contactless document scanning, and voice command.
- **Digital health passports:** These include on-site COVID-19 testing, providing guidelines for passenger health screening, and the use of thermal cameras, symptom-analyzing and contact-tracing apps.

Substitution

- Online and/or telepresence, instead of traveling
- Private or charter flights instead of commercial flights
- 'Visit' virtual tourist sites

New Normal

- The pandemic has accelerated two trends: (i) seamless travel, and (ii) decentralization of identity.
- Measures to ensure the health and safety of travelers will be stepped up before departure, during the flight, and on arrival. This may involve the use of new applications to check passengers' health and contact-tracing.
- Airlines might look to develop new income streams from the sale of PPE, such as masks and gloves.

Source: Krungsri Research

Hotels: Swift upgrade to 'smart hotels' to meet rising demand from Gen Y and Gen Z travelers

Digital solutions

- Available services in smart hotels and smart rooms include making online reservations and using a smartphone to control room appliances e.g. change air conditioner settings, and open/close windows and doors, communicate with staff, order room service and check flight schedules.
- Mobile payments are more convenient than cash, and also more hygienic and could reduce risk of contracting COVID-19.
- In the future, hotels might also automate check-in and check-out procedures, and use robots to replace bell boys.

Substitution

- *Airbnb* is taking market share from hotels and, to attract more customers, has taken steps to improve its public health standards.
- Virtual and augmented reality may be a way to develop virtual tourism in areas that are environmentally sensitive. However, although this may support sustainable tourism, local hotels and other tourist accommodation will see a drop in income.
- 'In-home leisure' or 'go nowhere' could get a boost with future advances in technology, and increased spending on home entertainment systems may encourage individuals to stay home rather than undertake long journeys to visit crowded tourist attractions (according to reports by 'The Future of Free Time' and 'Future Foundation').

New Normal

- *Travel bubbles* will allow quarantine-free travel between countries that are deemed low risk for COVID-19 or have successfully controlled the domestic outbreak (for example, China-Singapore *travel bubble*). However, travelers might need to submit a digital health passport application (DHP) through a mobile app.
- Thailand's Safety and Health Administration (SHA) scheme, which is supported by the Ministry of Public Health and the Ministry of Tourism, is tasked with certifying tourist sites, hotels and restaurants are safe and meet agreed public health standards.
- *Solomo* tourism (social-local-mobile) refers to the practice of using mobile technology to look up information on intended travel destinations on social media networks. This is an increasingly important aspect of individual and small-group travel.

Source: Krungsri Research

Restaurants: Increasing digital business services

Digital solutions

- Because they allow for easy, convenient and rapid communication with customers, retail operations that are delivered through online channels such as social media (e.g. Facebook and Instagram) or restaurant websites are increasingly important.
- Restaurants are developing products that meet rising demand for take-away/home-eating.
- E-payment systems, such as online banking or via QR code, are also taking on greater importance.
- Restaurants are partnering with mobile-based delivery services such as *Line Man*, *GrabFood*, *Food Panda* and *Get Food* to exploit opportunities to grow their income in the COVID-19 era. Indeed, 63% of consumers now believe it is more convenient to use delivery services than to dine-in at restaurants.

Substitution

- Chilled and frozen ready-to-eat meals
- Home cooking
- Street food

New Normal

- Food delivery applications help to meet consumer demand for speed, convenience and safety (which has become especially important since the COVID-19 pandemic).
- There is rising demand for healthy and nutritious food.
- Restaurants might use technologically-advanced kitchens to prepare food for delivery which has been ordered through a mobile app.

Source: Krungsri Research

Modern trade: Developing omni-channel platforms and building partnerships with other businesses

Digital solutions

- Application development and the use of omni-channel distribution (parallel on- and off-line distribution channels): Retailers are offering omni-channel shopping and delivery options to customers:
  - **Mobile commerce apps:** Retailers use data analytics and machine learning to help make major business decisions.
  - **In-store catalogue apps:** Retailers offer consumers the use of in-store catalogue apps that can be accessed through smartphones.
  - **Location-based marketing apps:** Consumers can access the nearest branches instantaneously through the app.
  - **Price list apps:** These provide consumers with better, more complete information to support their purchasing decisions.



Substitution

- **E-commerce platforms:** These are homes to a large number of buyers and sellers, which allows platform operators to track consumer behavior and preferences. Operators can then use this information to produce private brands which cost less but are able to meet consumer needs. The most popular sales channels in Thailand include:
  - Social media: Line, Facebook and Instagram
  - E-marketplaces: Lazada, Shopee and JD Central
  - E-tailers/brands.com: Central, Tesco Lotus, King Power, JIB, TVD, etc.

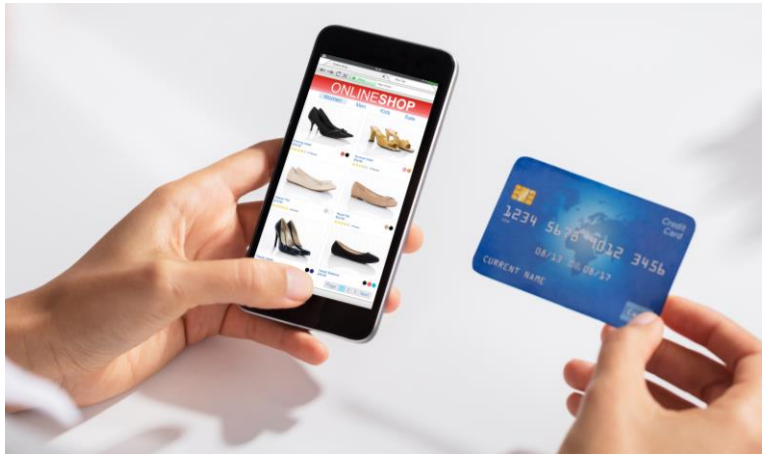
Source: Priceza, Krungsri Research

Retailers will improve health and safety standards and develop strategies to offer value-for-money products

New Normal

- 'Omni-channel' distribution is becoming more important as consumers get more comfortable with online shopping.
- Retailers are increasingly selling online, which is creating competition.
- Retailers are establishing new norms by highlighting health and safety standards in their goods and services.
- Changes to purchasing behavior and consumer spending power are encouraging retailers to develop strategies to offer value-for-money products and services, which could lead to the growth of private labels.
- The rapid growth of online markets and increasing demand for delivery services are forcing modern trade outlets to build partnerships and expand their online presence to preserve existing and attract new customers.





Source: Krungsri Research

Real estate for sale: Moving towards online sales and the use of VR

Digital solutions

- Using virtual reality tours (VR tours), live-online tours, and video reviews to allow potential buyers to view properties through a website or other online channel as if they were there in person, but without leaving home.
- Using digital tools, individuals will also be able to easily and swiftly reserve, pay for and transfer ownership of properties from their home.
- It is possible to buy properties through the LINE Official Account, which allows buyers to reserve properties, sign contracts, check rooms, make appointments to transfer title deeds, and secure promotions that are more attractive than those available on other channels (for LINE-based followers).
- Consumers can reserve properties and make payments through e-marketplaces such as Lazada and Shopee.

New Normal

- Following the lockdown and social distancing measures, new technologies have been introduced to support sales staff. This meant that online sales and the use of VR will become more important. These changes would lead to increased online bookings, and help to compensate for fewer walk-in customers.

Source: Krungsri Research

Real estate for rent: Moving towards scalable floor space and flexible rental contracts

New Normal for Retail space

- **Smaller rental units:** Because of the rising importance of online sales, the average floor space for retail rental units is expected to shrink by 20-40% relative to the pre-COVID-19 period (source: CBRE). Renters of large shops are expected to reduce physical store space or use them to allow customers to experience the products (after having carried out earlier research online) or to offer after-sales service.
- **Rents will be more flexible and contract periods will be shorter:** Instead of fixed rates, rental contracts would increasingly take the form of 'partnership rents' calculated as a percentage of store income, albeit with a minimum guaranteed rent. Rental terms may also be more flexible (depending on the type of shop) and have shorter contract periods.
- But unlike some other countries, in Thailand, online shopping cannot yet replace the full range of options available at brick-and-mortar stores. Although online sales have risen over the last 3 years, with a big push from the lockdown and the need to make online purchases of daily consumables, online sales account for only 3% of total retail sales (source: Central Retail Corp. and Index Living Mall).

New Normal for Office buildings

- **Activity-based workplaces are becoming more attractive:** Workspaces need to be more flexible and responsive to changes in business activities (to support social distancing, teams will be more dispersed, and this will make it easier to transition to a paperless office environment).
- Working from branch offices and using cloud-based platforms can help build resilience and allow staff to continue working if they are unable to come into the office.



Source: CBRE, Krungsri Research

Transportation and Logistics: Greater adoption of data analytics and digital technology

Digital solutions

- Using block chain technologies to support data storage and management.
- Using in-vehicle monitoring systems (IVMSs) will reduce accident rate and adulteration of transported goods.
- *iSpot* solutions and electronic container tracking systems (ECTSs) can help to track shipments and reducing time spent checking and releasing containers.
- Providing electronic proof of delivery can be used to trace deliveries and distribute goods using GPS mobile tracking.
- Using logistics ePods allows for the real-time tracking of shipments and helps ensure on-time delivery to the correct destination.

New Normal

- Focus on data analytics, digital technology and hyper-connection between regional logistic networks.
- Goods delivery emphasizes the use of automated systems, including warehousing, autonomous vehicles, drones, etc.
- Mobility businesses, and in particular tech-based providers, will have an even greater role.

Source: Krungsri Research

Automobiles: Build resilient supply chains and offer rental services to sustain long-term business

Digital solutions

- Tier 1 auto parts manufacturers are joining hands to form supplier networks that are linked through a transparent digital supply chain solution. This would give manufacturers access to a proactive backup supply source of tier 1 parts of similar quality, thus, reducing the risk of supply shortage.
- Players are developing platforms to support online distribution, for example by launching new models online, allowing buyers to reserve cars directly through the manufacturer's website, and professionalizing the online-to-offline customer journey, including pickup and delivery of new vehicles.
- Manufacturers are also setting up remote processes to maintain operations.

Substitution

- Rental services offering long-term leasing to private customers are being established to meet demand from customers who, to reduce risk of exposure to COVID-19, want to use their own vehicles rather than rely on public transportation. Renting allows individuals to avoid maintenance, insurance and road tax expenses, and they can control their own expenses (fuel and toll fees).

New Normal

- Manufacturers are adjusting operations by partnering with parts manufacturers to form a reserve parts supply network, which they can draw upon in the event of a crisis. Operators are also developing platforms to support online markets.
- Operators are building resilient supply chains.
- In the future, to increase efficiency and better respond to customer needs, manufacturers will exploit big data resources developed from online distribution to help with production planning, delivering new vehicles, approving loans, and offer after-sales service.
- Online sales are being professionalized, with this extending through to pickup and delivery.
- Large investments are being made in autonomous vehicles.
- The response of the automotive industry to the four megatrends (connected, autonomous, shared and electric driving) is expected to be unchanged, as these same trends will continue to drive the evolution of the industry. However, the speed of adoption might change following the COVID-19 pandemic.

Source: Krungsri Research

Construction: Accelerate adoption of digitalization and scale up off-site construction

Digital solutions

- Digital collaboration tools such as building-information modeling (BIM) which is an intelligent 3D model, will be used to rebalance supply chains to secure critical materials & workers and identify alternative suppliers.
- Increasing adoption of modular building systems or off-site construction, for example, frames and volumetric modules which can be assembled in a factory and then delivered to the building site. This would allow building material manufacturers to collaborate in designing new product features to support building-site activities. Off-site construction can also contribute to sustainability goals by reducing material waste and enabling circular building systems.
- Other tools will be used during the early stage of reopening: (i) Digital apps for remote working, monitoring employees' well-being, managing scarce resources, and reduce the number of workers on a site; (ii) wearables and AI sensors to detect social distancing practice of workers, and (iii) virtual site inspection to enhance safety and reduce the time it takes to perform jobs.

Substitution

- In the longer term, we expect the adoption of full modular building systems in commercial spaces such as shopping malls, trade centers, and office spaces. This would replace some parts of on-site construction to reduce costs and construction time. According to McKinsey, the market value of permanent modular construction industry in North American real estate has grown by 50% from 2015 to 2018.

New Normal

- Adoption of information management and modular building systems will accelerate with remote collaboration.

Source: Krungsri Research

Agriculture: Taking the opportunity to strengthen food security

Digital solutions

- **Near-term changes in the agriculture sector:** To maintain social distancing rules, farmers and other players in the sector are increasingly turning to e-commerce as a new distribution channel. Use of online platforms would increase demand for digital payment systems.
- Drones and robotic systems are being used to replace manual labor, both for planting and harvesting.
- Sensors are being used for quality control and monitoring of soil quality, insects, and water supply, among other things.
- Precision automatic control systems are being used to determine the precise irrigation requirements in an selected area.
- Food safety tracking and tracing allows users to check the origins of plant and animal products.
- Food safety detection systems include systems used to check for chemical residues in meat and plant products.
- Crop marketing/trading platforms/digital marketplaces.
- Data analytics platforms/data aggregators/imagery analytics/integrated solutions can help to aggregate and analyze information to build more efficient agricultural models, reduce risk, and helping with management.
- Mobile money is crucial in disbursing aid to rural communities in a crisis.

Substitution

- Manual farm labor may be replaced by robots during harvesting, and drones to deliver chemical inputs.
- New innovations may allow for the substitution of some products, for example, cultured meat and 3D printing. These could be engineered to be free of contamination and communicable diseases, and could be a sustainable alternative to field crops and products derived from livestock. However, the production costs are not feasible currently.
- The government and large private-sector players are introducing biodiversity strategies to minimize the consequences of future crises, such as the impact of climate change, forest fires, food insecurity or disease outbreaks (source: FAO).

Source: Krungsri Research

Transitioning to *smart farming* using advanced technology and shifting towards value-added products

New Normal

- Transitioning to smart farming using advanced technology (IoT, data analytics, 3D printing) and shifting towards value-added products (e.g. plant-based meat).
- **Blockchain applications may be introduced in the shape of track and trace systems.** These will help to build consumer confidence in agricultural products throughout the 'farm-to-fork' journey, i.e. ensuring that health and safety standards are maintained at the farm and throughout the processing and distribution process.
- **Agricultural e-commerce can be the 'new normal'** because during the height of the COVID-19 pandemic, the use of 'farm-to-fork' digital solutions has grown rapidly driven by rising demand from individuals during the lockdown. These agri-tech solutions which connect farmers directly with end-consumers have digitized the market, and is becoming the norm.
- **Production should focus on ensuring food security** through, e.g. closed EVAP systems, vertical farming, and indoor farming, though this requires new technologies and skills.
- Production of agricultural goods should meet consumer demand for food with premium nutritional values and food safety standards.

Source: Krungsri Research

Changes in the agriculture sector

The ongoing changes may be split into 3 groups according to the COVID-19 impact:

Short Term

- Farmers (including livestock farmers): COVID-19 impact has been limited because farmers are generally physically distant from urban centers.
- Food processors: Large impact, especially on slaughterhouses and meat-processing facilities.

Medium Term

- Labor shortages in some areas might affect harvest.
- Supply chain disruptions, in terms of both shortage of inputs and weak access to distribution channels.
- Disruption to distribution channels will have financial impact, especially on cash in circulation.
- International trade might shift to focus more on food security, which would stimulate higher domestic yields.

Long Term

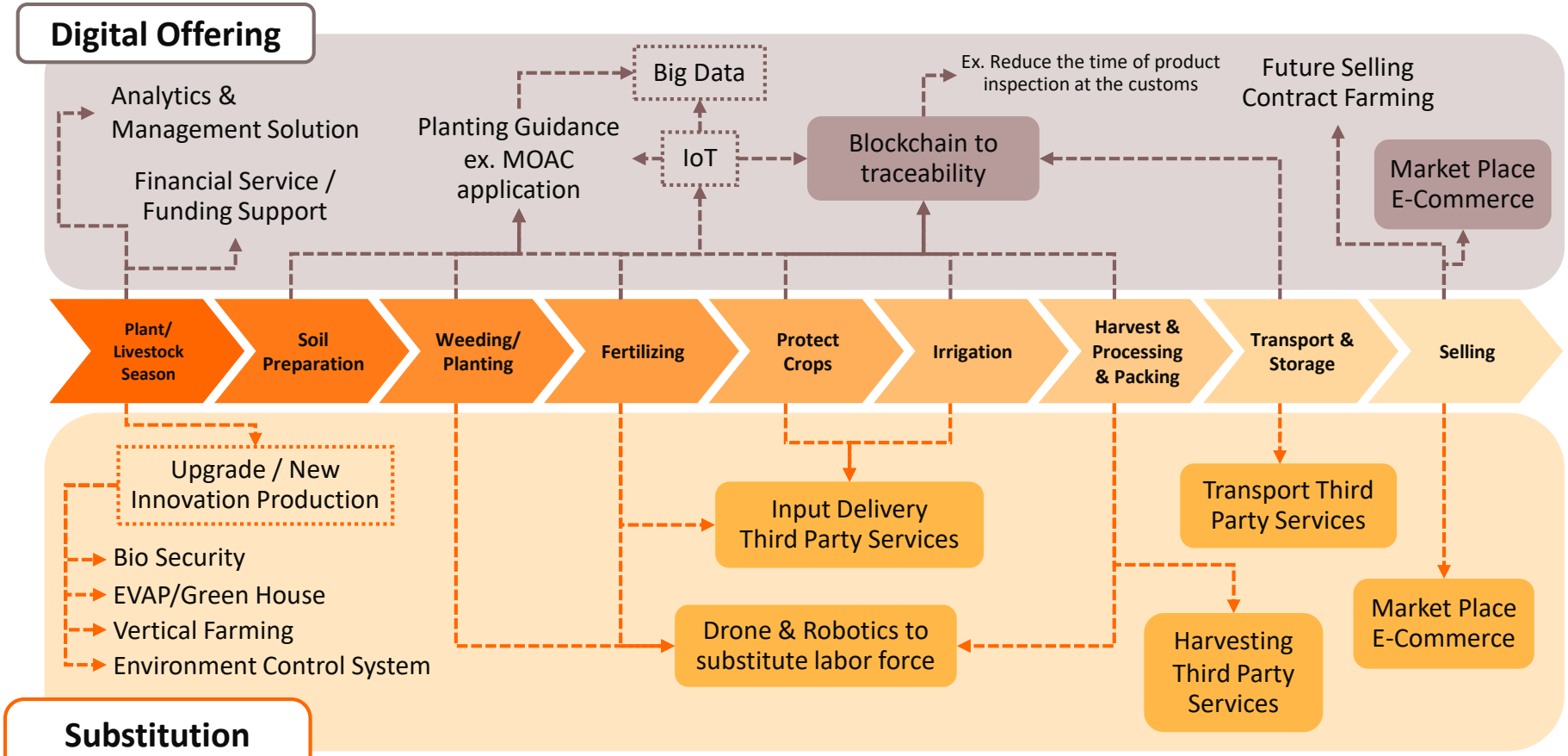
- Structural changes in production and consumption.
- Changes to policies on national food security. This will create new opportunities as well as reduce future risks. This changes can be split into two:
  - Changes to increase household food security.
  - Changes to meet demand in the agro-processing industry.

Changes		Agriculture Type
Digital	**Substitution**	
▪ E-Commerce ▪ Planting Guidance	▪ Bio security	Traditional
▪ E-Commerce ▪ Blockchain to traceability	▪ Bio security	Company
▪ E-Commerce ▪ Financial Services and funding support	▪ Third Party Service on Platform ▪ Bio security	Traditional
▪ E-Commerce ▪ Blockchain ▪ IoT ▪ Financial Service and funding support	▪ Drone & Robotics ▪ Indoor Farming ▪ Bio security	Company
▪ Analytic & Management Solution	▪ Environment Control System ▪ EVAP/Green House	Traditional
▪ Blockchain ▪ IoT ▪ Big Data ▪ Analytics & Management Solution	▪ New innovation production ▪ Vertical Farming ▪ EVAP/Green House ▪ Cultured Meat ▪ 3D Printing	Company

Source: Krungsri Research

How is the pandemic reshaping the agriculture sector?

The pandemic has affected the agriculture sector in 3 ways: (i) Labor shortage issue has worsened; (ii) logistic problems; and (iii) rising public health concerns. This will prompt players in the sector to change process to be less labor-intensive, broaden their distribution channels, and try to build consumer trust in their products.



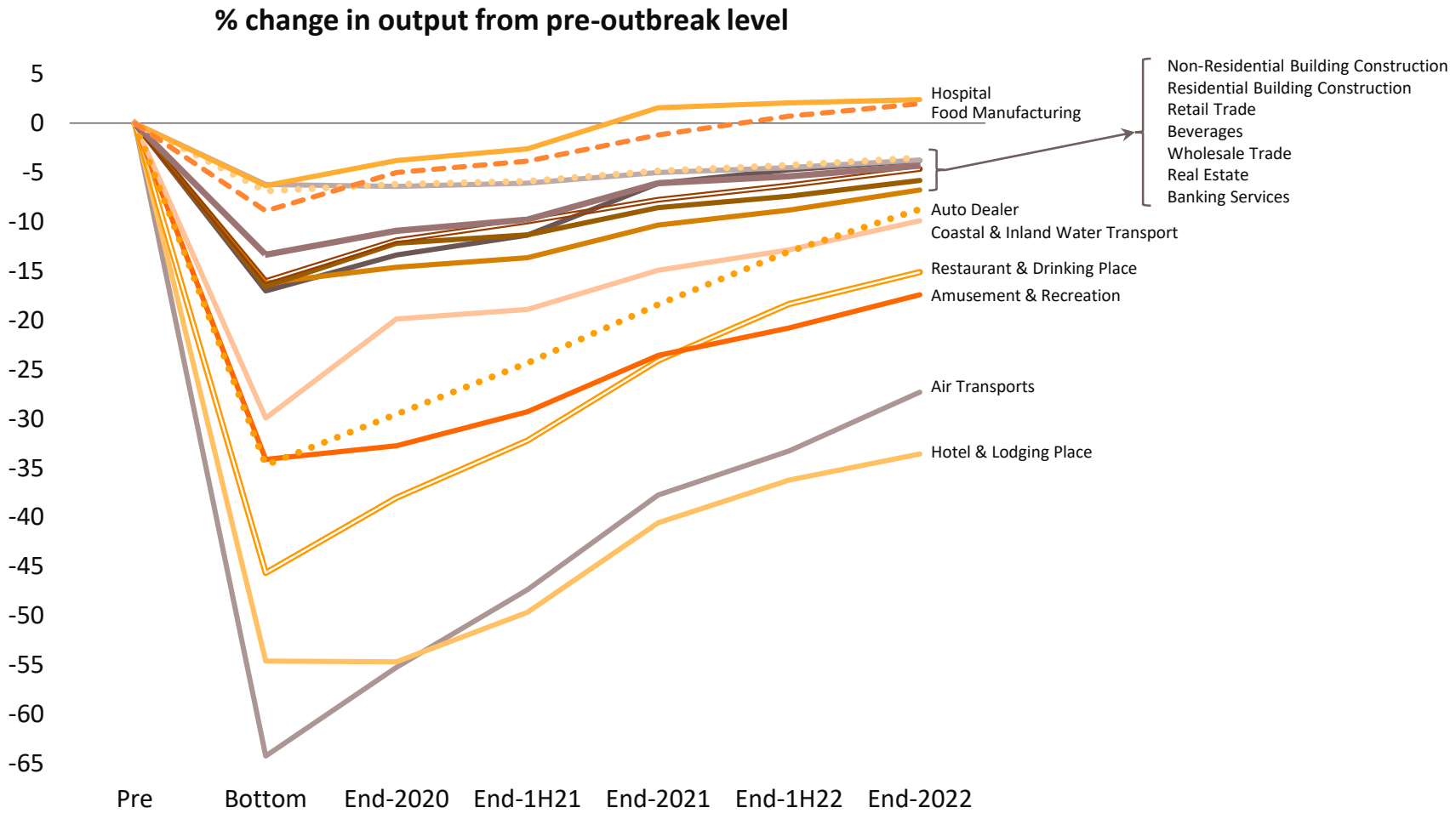
Source: Krungsri Research



RECENT DEVELOPMENTS

Recovery trajectories for major industries after reopening

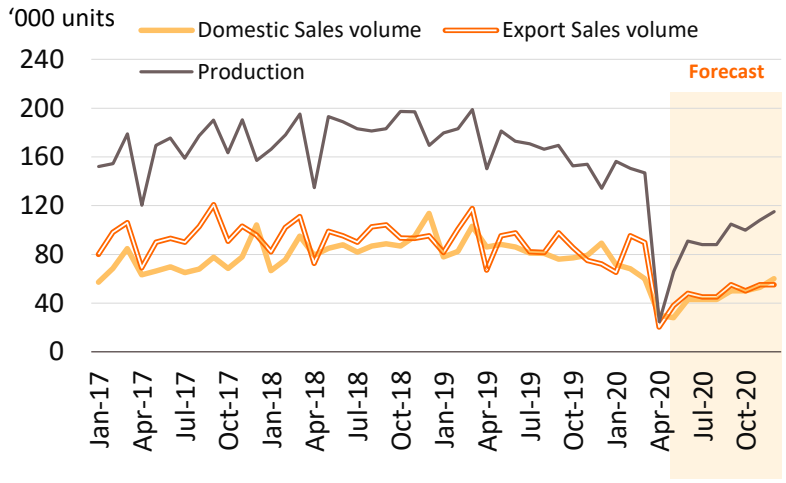
Our analysis suggests only Hospital and Food Manufacturing sectors would return to pre-pandemic level by end-2021. Air Transportation, Hotel, Restaurant, Auto dealers, and Amusement & Recreation sectors would continue to suffer until end-2022. Construction, Retail, Wholesale, and Beverage sectors have been severely affected but they would rebound faster than other sectors.



Source: GTAP, NESDC, Krungsri Research

Automobile: Temporary plant shutdowns triggered by falling demand will lead to 37% drop in 2020 output

Automobile Production and Sales



- The COVID-19 pandemic has severely hurt both demand and supply in the auto industry. The temporary shutdown of auto manufacturers and assemblers has disrupted supply chains. Auto output had dropped by 40.2% YoY in 5M20 because of this, but it was also because uncertain economic conditions have prompted consumers to postpone purchases of durable goods such as cars. Demand (both domestic and international) remains depressed.
- In the second half of the year, output should improve as most of the lockdown measures have been lifted and manufacturers want to stimulate sales with the release of new models and offering attractive pricing packages. But for full-year 2020, output is projected to fall by about 37%, which would have serious consequences on the entire auto supply chain, including parts manufacturers and distributors.

Source: The Federation of Thai Industries (FTI), Krungsri Research

Automobile factories which had closed temporarily

TOYOTA	**Samrong Plant:** 7-11 May 2020 **Ban Pho Plant:** 7 Apr-11 May 2020 **Gateway Plant:** 7 Apr-25 May 2020
ISUZU	**Samrong Plant:** 13 Apr-5 May 2020 **Gateway City Industrial Estate Plant:** 13 Apr-18 May 2020
HONDA	**Ayutthaya Plant:** 27 Mar-30 Apr 2020 **Prachinburi Plant:** 27 Mar-30 Apr 2020
NISSAN	**Plant 1 at Samutprakan:** Did not close factory **Plant 2 at Samutprakan:** 6 Apr-31 May 2020
MITSUBISHI MOTORS	**Plant 1 at Chonburi:** 1-26 Apr 2020 **Plant 2 at Chonburi:** 1-19 Apr 2020 **Plant 3 at Chonburi:** 1-22 Apr 2020
Ford	**Auto Alliance Plant at Rayong:** 27 Mar-15 May 2020 **Ford Thailand Manufacturing (FTM) at Rayong:** 27 Mar-15 May 2020
mazda	**Auto Alliance Plant at Rayong:** 23 Mar-12 Apr 2020

Note: As of 3 May 2020

Automakers accelerating adoption of digital technologies to strengthen supply chains, expand marketing channels

The sharp contraction in auto output was triggered by a combination of supply chain disruption and weaker demand worldwide. This will accelerate changes in how manufacturers structure assembly lines and marketing strategies after reopening the economy.



- **Manufacturing and assembly:** Auto makers want to improve supply chain security and have proactively identified several alternate supply sources. This has driven them to widen the network of tier-1 parts suppliers and seek partners which can supply products quickly and meet quality requirements, whether overseas or elsewhere in their commercial network. Players will also increasingly use transparent digital supply chain solutions to reduce risk of supply shortages in any individual country.
- **Marketing:** Auto manufacturers will expand the use of two marketing channels:
  - **Companies will accelerate the development of their platforms to support more intense efforts to develop online distribution channels.** To encourage more auto purchases, these platforms will offer a comprehensive range of functions, abilities and activities, including launching new models online, allowing buyers to reserve new vehicles directly, using big data analytics of online distribution activity to better plan production, approving credit, and offering better after-sales and bespoke customer service.
  - **Increase income from long-term car rentals.** This move will exploit the 'new normal' that is evolving because of social distancing rules. They are targeted at consumers who are not prepared to buy a new vehicle, but need one. For example, Toyota is offering a long-term rental option called *Kinto* that is aimed at leasing to private individuals, instead of organizations which had been its focus previously.

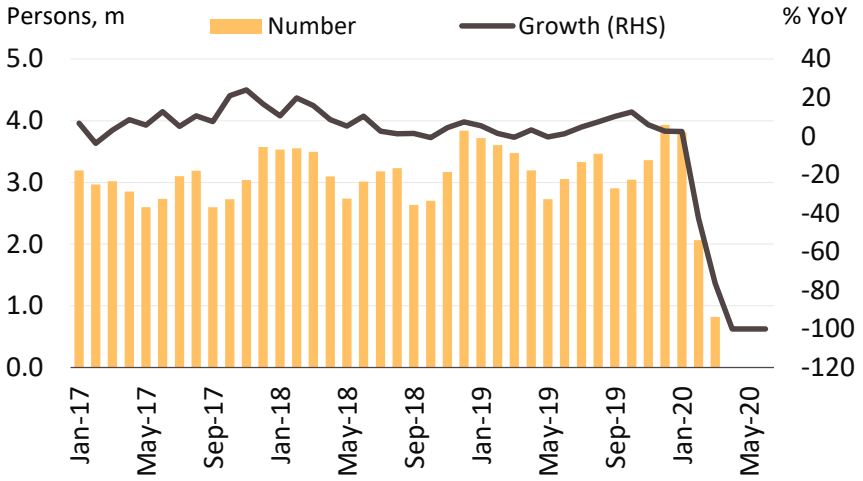




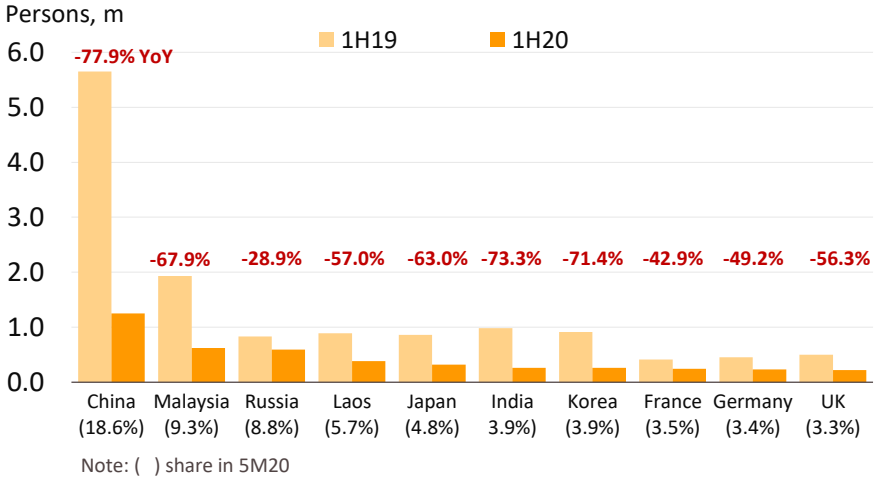
Source: Local press, Krungsri Research

Hotels: Following the ban on inbound flights, there were zero tourist arrivals in Thailand in 2Q20

Foreign tourist arrivals

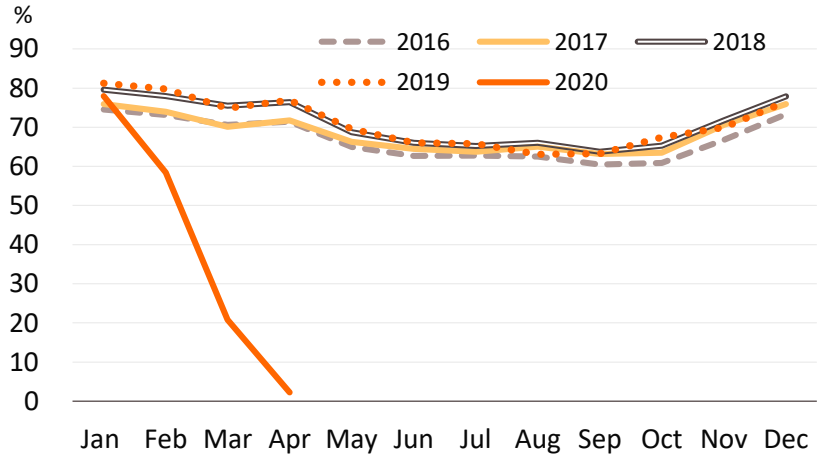


Tourist arrivals by country



Note: ( ) share in 5M20

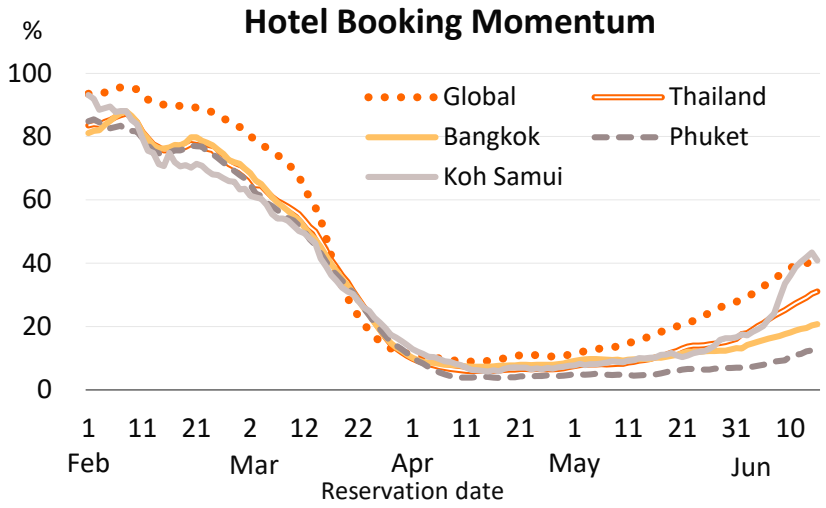
Nationwide Average Occupancy Rate



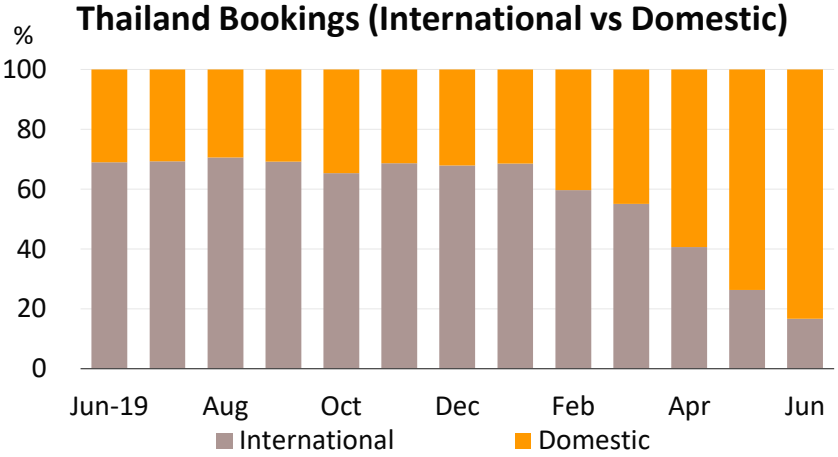
- Thailand had closed its borders since April to contain the spread of COVID-19. This had reduced international tourist arrivals to zero in 2Q20 and caused 1H20 arrivals to tumble 66%, led by China (-78%), India (-73%) and South Korea (-71%).
- Looking ahead, arrivals would be weak for the rest of 2020, and full-year arrivals is projected to tumble by 83%.
- Occupancy rates at hotels and lodging also fell to historic lows in April, at only 2.3%, although they had tumbled to 20.8% in March following restrictions in international and domestic travel. This prompted many hotels in Thailand to shutter their doors temporarily, and occupancy rates averaged 40% in 4M20, half that in 4M19 (78.2%).

Source: Ministry of Tourism and Sports (MOTS), Krungsri Research

Hotel bookings continue to rise after hitting bottom in March and April when COVID-19 cases accelerated



Note: Booking momentum indicates % changes of current hotel booking, compared to the previous year.

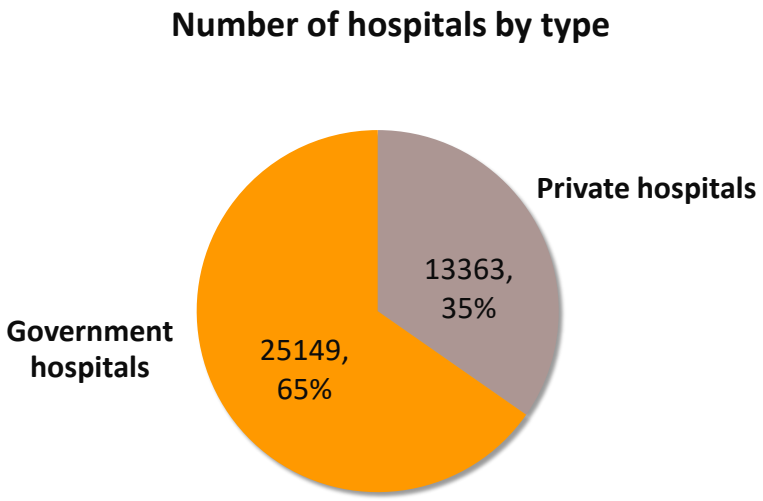


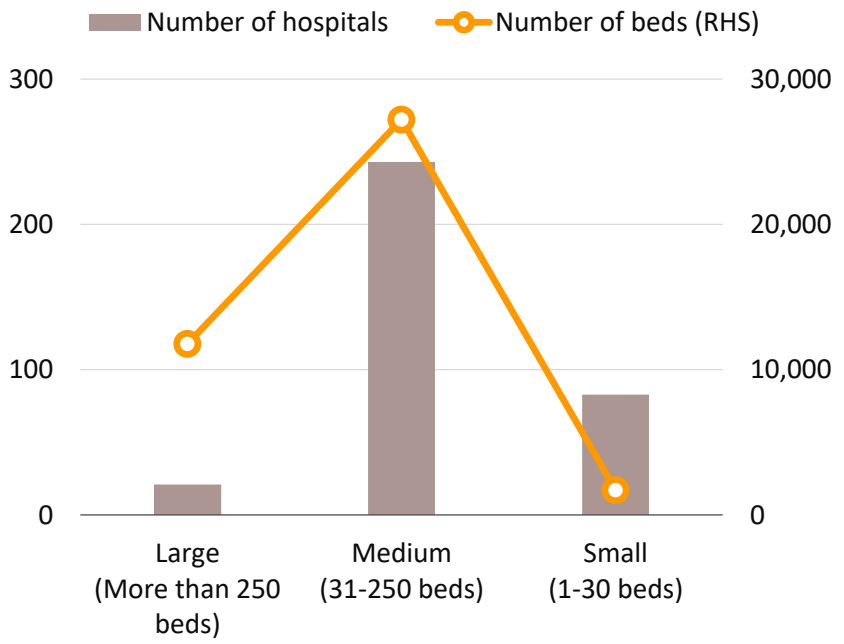
Note: Displays the makeup of domestic and international bookings made over the past year.

Source: www.siteminder.com

- Compared to last year, global hotel bookings had crashed from an average of 90.6% in February to 46.3% in March and only 10.2% in April. Worldwide lockdowns had forced hotels and airlines to temporarily suspend normal operations. However, there is still demand for tourism and bookings would accelerate again. Since easing domestic travel restrictions, hotel bookings had risen to 18.4% in May and to 35.7% on 13-15 June, close to the 40% registered in the year-ago period.
- Thai hotel bookings notched 79% in February but tumbled in March and April. The situation started to improve in May but throughout May and June, bookings at major tourist destinations (Bangkok, Phuket and Samui) remained slow, especially on Samui.
- Compared to the situation before the pandemic, there has been a change in the ratio of international and local hotel guests. Before the pandemic, about 70% of room bookings were made by non-Thais, but following the ban on inbound flights, that had dropped to 16% in June. At the same time, the government has introduced measures to stimulate domestic tourism from July to October; this helped to lift the ratio of domestic guests to around 80% in June from just 30% in 2Q19.

Hospitals: Thailand might have the opportunity to become a *medical hub* sooner than planned

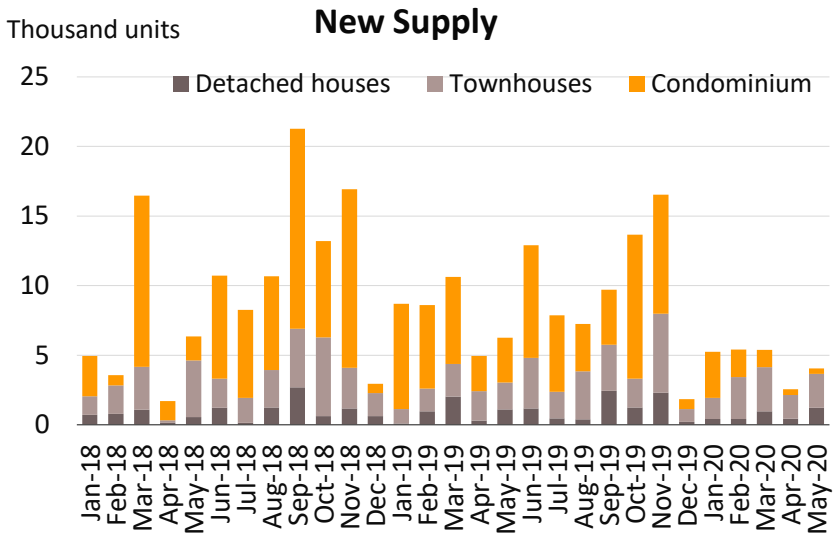


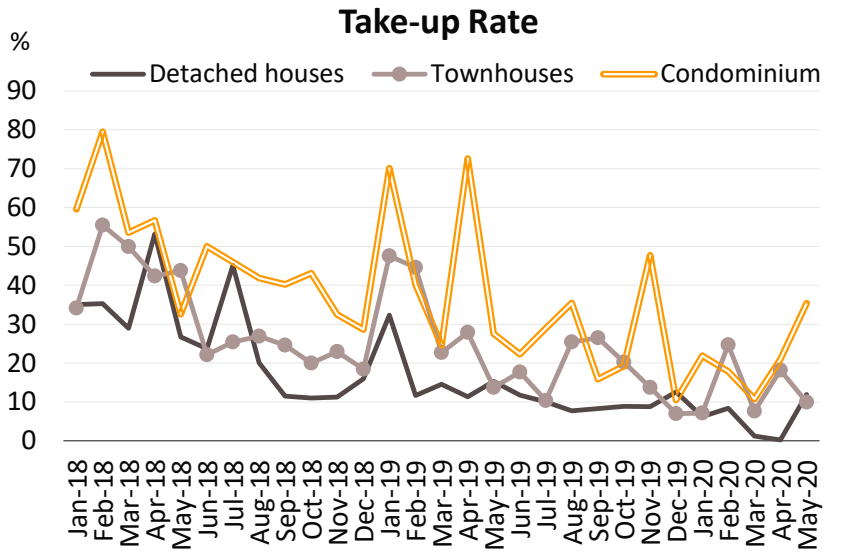


- **Tele-health, telemedicine and tele-consultation:** using technology to provide health services (health examination) at home. This includes health information services, healthcare education, and healthcare services in a broad sense.
- **Employ** AI, Blockchain and new applications (such as *Doctor Anywhere*), offer drive-in healthcare and diagnosis services such as blood tests, and using new applications to communicate with healthcare providers (appointment systems, medicine distribution systems) to support social distancing.
- **Offer high-end home healthcare services**.

Source: Ministry of Public Health (MOPH), Krungsri Research

Housing in BMR: Demand has tumbled, prompting developers to hold back new projects to ease oversupply



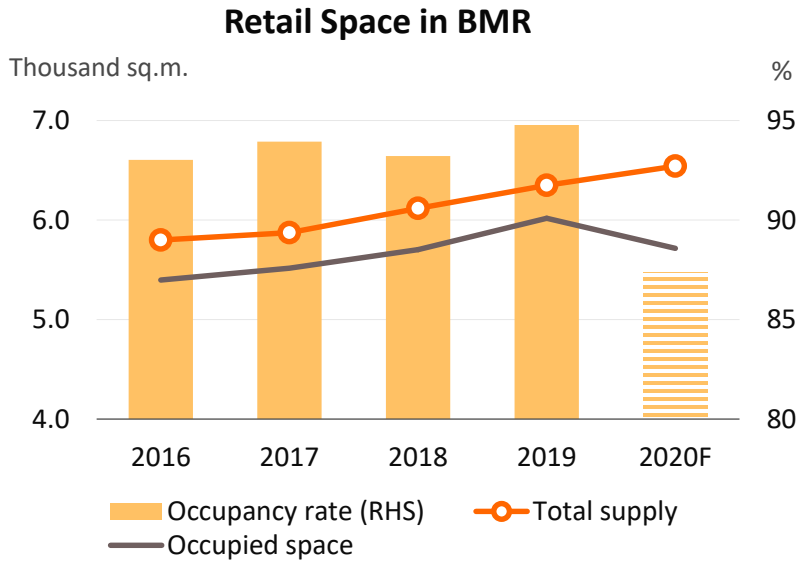


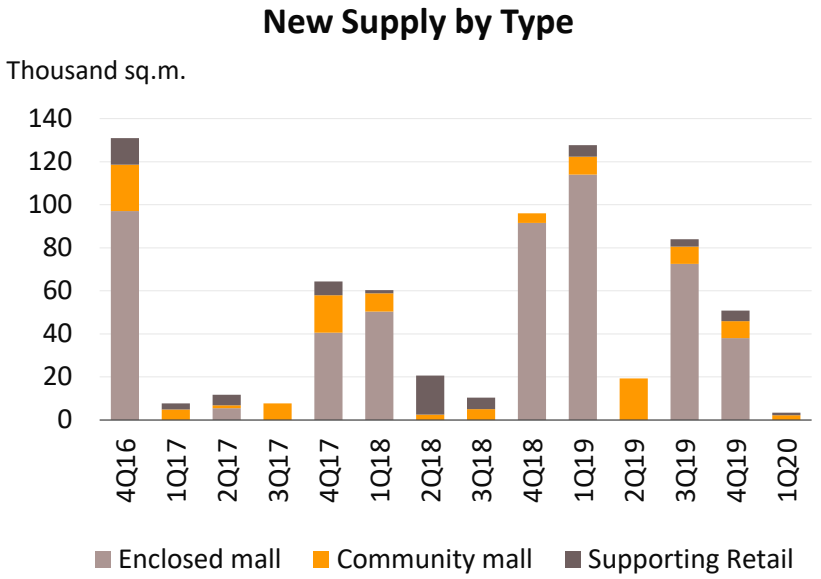
- **In 5M20, there were only 22,674 new housing units launched in the BMR, tumbling 42.1% YoY.** The condominium segment saw the sharpest drop of 89.0% YoY, followed by detached-houses (-73.1%) and town-houses (-62.9%). This crash was triggered by a steep drop in consumer spending power, especially in 2Q20.
- This has prompted developers to hold back new projects and instead, focus on selling inventory units. They had employed several strategies, including offering more attractive discounts for completed properties including 1-2 year grace period during which accommodation is free, and lowering specs for new builds to make them more price competitive in the slow market and to attract buyers who have greater financial constraints.
- Developers that are facing cash flow problems are also looking to sell ongoing projects to other players to complete, or in some cases, sell whole floors or entire buildings to domestic and international developers at discounted prices.

- **In May, average take-up rates remained below average in all segments.** For detached- and town-houses, they were 11.9% and 9.9%, respectively (over the last 5 years, May average was 23.8% and 32.0%). For condominiums, take-up rate improved to 35.3% from 20.9% in April but is still well below the 5-year average of 54.1%.
- In 2H20, although the pandemic seems to be under control in Thailand, the poor economic outlook and the resulting impact on consumer spending will continue to depress the housing market in the BMR. Other factors that cold dampen the market include weak consumer confidence, inability to secure loans because of lower income of layoffs, and rising household debt.
- On a positive note, the number of new projects has fallen to a 10-year low. This will help to ease oversupply in the property market and return a degree of stability to the market.

Source: AREA, Krungsri Research

Retail space: Retailers severely hit by weak consumption, especially among the middle- and low-income groups





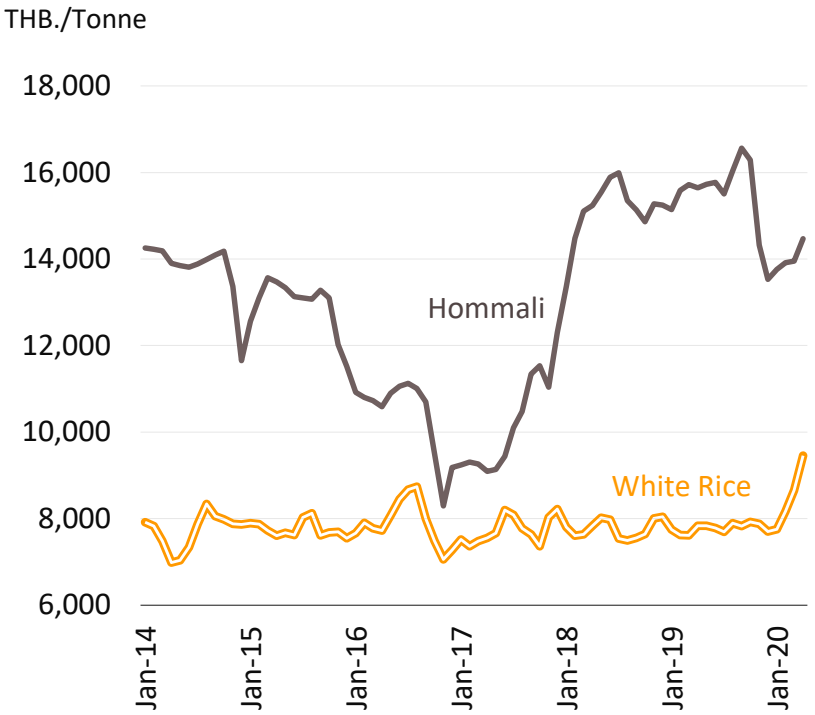
- **The weak outlook for consumption in 2020 would drastically demand for rental retail space, in line with the projected 5-8% drop in retail sales at modern trade outlets.** This segment will face several headwinds:
  I. The weak economy will dampen confidence and consumer spending. Indeed, the CCI (Consumer Confidence Index) had dropped to 48.2 in June, the weakest since the survey started in October 1998, during the Asian Financial Crisis.
  II. Drought would hit farm income and reduce purchasing power in the local economy.
  III. Weak tourism industry because of a drop in international and domestic tourist spending.
- The hardest hit segment would be community malls (that depend heavily on middle-lower income groups in upcountry). Enclosed malls that are dependent on middle-upper income groups, especially foreign customers, would be affected by the unprecedented crash in the tourism industry. Supporting (smaller) malls should see stable rental demand because of limited new supply.

Source: CBRE, Krungsri Research

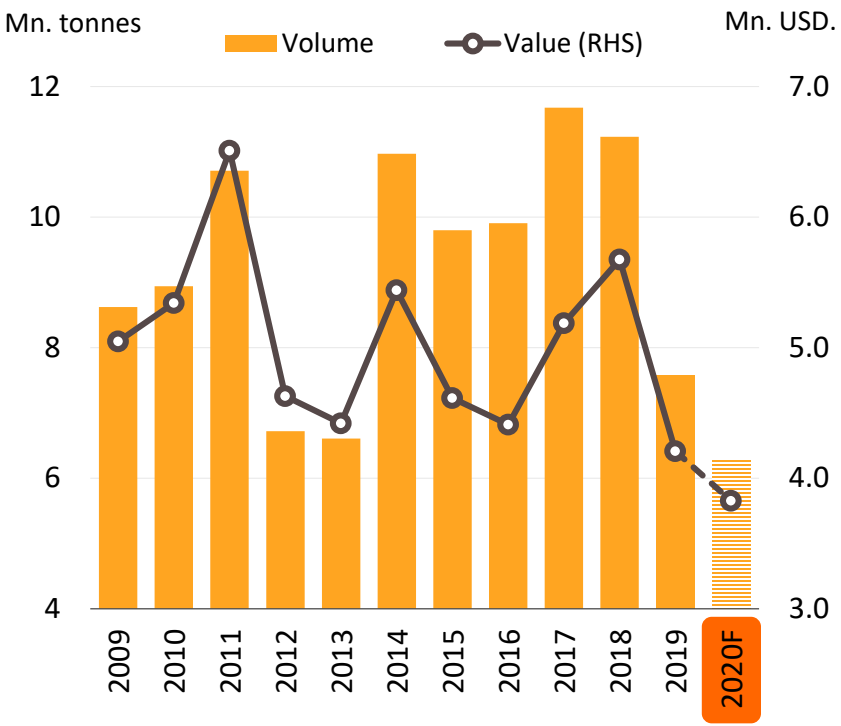
Rice: Pandemic has increased global demand for rice, but higher price for Thai rice could dampen exports this year

In the first 5 months of 2020, Thailand exported 2.6 million tonnes of rice (-31.9% YoY), generating USD1.7bn receipts (down 12.3% YoY). Exports slipped against rising sales in India, Vietnam, Pakistan, Myanmar and China because the 2019-2020 drought had reduced the output of off-season rice and lifted the price of Thai goods relative to their competitors, by an average of USD140/tonne, the widest price differential in 6 years. Although the pandemic has increased demand for rice overseas, higher prices for Thai rice would depress exports in 2020. We project rice exports would drop by 12-16% to 6.1-6.5 million tonnes this year, from 7.58 million tonnes in 2019.

Thai Paddy Price



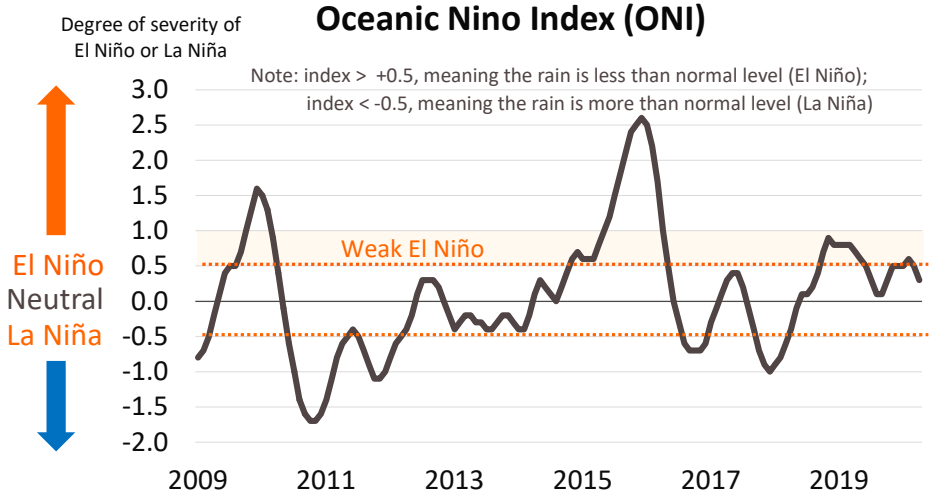
Thai Rice Export Volume



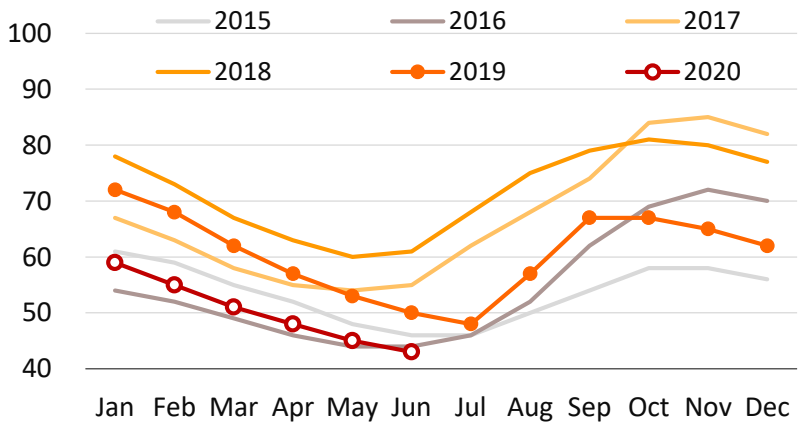
Source: Ministry of Commerce (MOC), Office of Agricultural Economics (OAE), Krungsri Research

Despite near normal rainfall, there is still drought risk due to low reservoir water levels and a delayed rainy season

El Niño (Drought): Oceanic Nino Index (ONI)



% Water storage



Source: NOAA, ONWR, Thaiwater, Thai Meteorological Department, Krungsri Research

Forecast rainfall (mm) during 2020 rainy season

	Jun	Jul	Aug	Sep	Oct
North	140-180	130-180	200-260	200-250	70-100
North East	160-200	170-210	230-280	220-270	60-90
Central	120-160	130-180	160-200	220-270	100-140
East	250-300	240-290	250-300	300-350	180-220
South (east coast)	100-140	100-140	100-140	130-170	240-290
South (west coast)	270-320	310-360	340-440	350-450	340-390
BKK and Vicinity	150-190	160-200	180-220	300-350	180-220



Forecast of rain 2020 by comparing with Normal Level (the 30-year average in1981-2010)

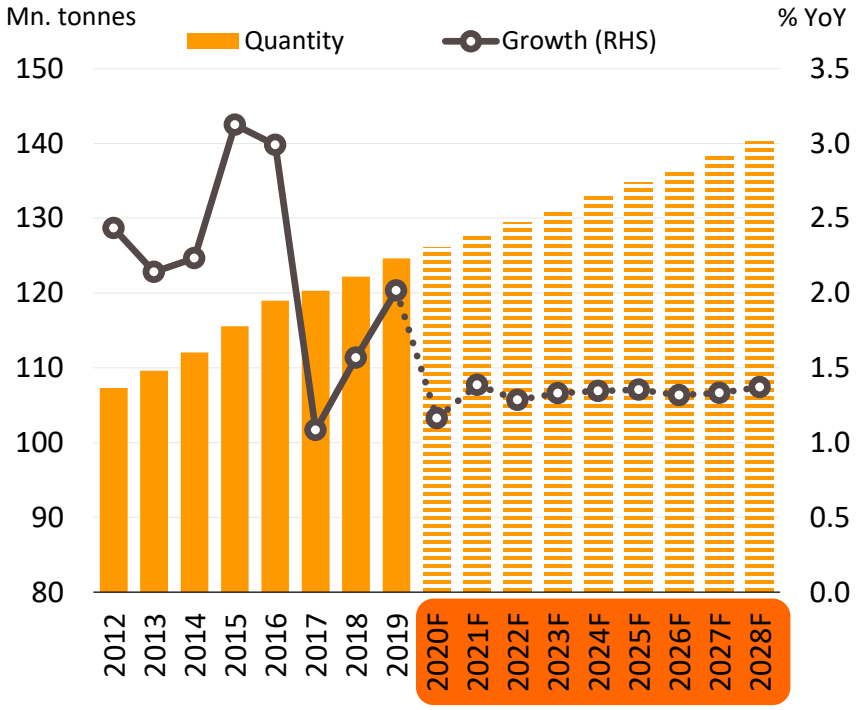
Environmental factors that are affecting the agriculture sector

- **Continued drought impact:** Between September 2019 and 5 June 2020, crops in 27 provinces had been affected by drought, with rice output suffering the most.
- **Persistent risk to output from a delayed rainy season:** Although Thailand has officially entered the rainy season and the ONI Index has dropped to near-normal levels, indicating improving weather conditions, farmers need to remain alert to water shortages and the impact on output. Reservoir levels are still low and authorities predict less-than-normal rainfall from the end of June through to mid-July. The risk is much greater in drought-hit areas without proper irrigation.

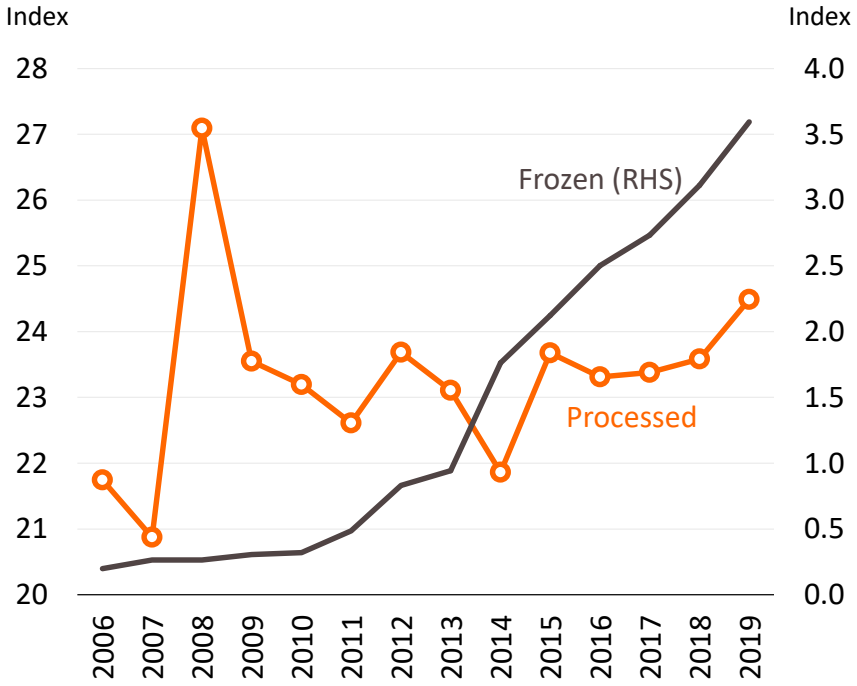
Frozen and processed chicken: Demand continues to grow, Thailand's strength in this segment will help exporters

Thai frozen and processed chicken products remain highly competitive, with a Revealed Comparative Advantage index (RCA) far beyond 1. And given that global consumption is rising steadily, the outlook for Thai players remains decent. In addition, the outbreak of animal illnesses in several countries (e.g. African Swine Fever and bird flu) and the subsequent shortage of meat products in the ASEAN zone have created opportunities for Thai producers to ramp up sales to overseas markets. Over the long term, these factors will support continued growth in the total export value of Thai chicken products.

Global Poultry Meat Consumption



Revealed Comparative Advantage Index (RCA) of Thailand Chicken Products



Source: Organisation for Economic Co-operation and Development (OECD), Krungsri Research

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