

# 2021 Taiwan SME Digital Transformation Survey



# Preface

PwC Taiwan, in cooperation with Taiwan's Institute for Information Industry (III) and the Information Service Industry Association of R.O.C. (CISA), conducted the first "Taiwan SME Digital Transformation Survey" in 2021. The report explores the current status of and demand for digital transformation among small- and medium-sized enterprises (SMEs) across six industries in Taiwan, including wholesale and retail; hospitality and food and beverage; metal products manufacturing; machinery and equipment manufacturing; electronic components manufacturing; and agriculture. The survey findings are intended to serve as a reference for local SMEs in developing their digital transformation strategies.

The study looks at the objectives that SMEs seek to achieve through digital transformation, the current status of and future SME needs for digital-related tools, the challenges they encounter during the transformation process, and the resources they require to achieve their digitalization goals. The COVID-19 pandemic, a shrinking working population, and supply chain disruptions have accelerated the resolve of small- and medium-sized enterprises to undergo digital transformation. Indeed, when responding to the challenges from the pandemic, Taiwan's SMEs showed themselves to be agile and flexible in seeking new solutions and using various support resources to adjust their business models.

The survey finds that most SMEs regard transformation as a means to reduce operating costs and expand market growth. However, they face difficulties such as a lack of digital skills and talents, inexperience of digital

transformation projects, and not knowing the best industry transformation practices.

Faced with such challenges, SMEs expect the government to support them with resources such as talent development, mentorship and counseling, as well as project consultation to achieve digital transformation. The report classifies SMEs into four stages of digital transformation (beginner, explorer, focuser and leader)—based on the number of digital tools used and the revenue growth contribution derived from digitalization—and provides recommendations and resource information to help them quickly position themselves, as well as serve as a reference for their future digital development.

PwC Taiwan's 2021 Taiwan CEO Survey similarly found that digital transformation is a key competitive differentiator. Companies that laid a digital foundation before the pandemic were seen to be better protected against unknown risks than those that had failed to plan ahead. With the advent of the digital era, companies need to accelerate their digitalization efforts in order to deal with a new wave of competition.

The report was produced with the help of partners from industry, government, academia and research institutes. We hope it provides useful guidance for SMEs to grow and move forward together in this challenging but promising digital era.



Joseph Chou  
Chairman & CEO  
PwC Taiwan

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Jacky Lu  
Head of Consulting  
PwC Taiwan

A handwritten signature in black ink, featuring three distinct characters in a cursive style.



# Foreword

The rapid development of new digital technologies has radically demarcated market and industry boundaries, and in turn significantly impacted all industries. As a result, digital transformation has become a major topic of concern in national and industrial development in recent years. While these digital developments hold great opportunities for businesses, they also present major risks and challenges.

**The government is keeping pace with international trends to encourage investment in digitalization and innovation**

Taiwan is a major hub for advanced manufacturing and semiconductor production and an integral part of the global IT supply chains. The information and digital technology industry, which is a priority strategic sector for Taiwan, is currently facing challenges from US-China trade tensions, geopolitical turmoil and the COVID-19 pandemic. The government strives to transform the industry, with the aim of making Taiwan a key force for digital innovation in Asia.

Amid increasingly intense geopolitical competition, many of Taiwan's neighboring countries have launched digital innovation strategies (such as Japan's Society 5.0, South Korea's New Deal and Singapore's SMEs Go Digital), which marshal government resources to help enterprises adjust to the impact of digitalization and drive industrial evolution through digital innovation. In Taiwan, the government is currently promoting the Cloud Generation Industry Digital Transformation Program and actively invests to improve the digital innovation environment through policies like TCloud so as to encourage the transformation of local enterprises.

**The digital progress of small and medium enterprises is crucial to the competitiveness of industries and nations**

SMEs are the major driving force of Taiwan's economy and generate a large number of job opportunities. As of 2020, there were more than 1.5 million SMEs in Taiwan, which account for approximately 98% of all business enterprises and employ more than 80% of the country's total workforce.

As SMEs are the cornerstone of Taiwan's economic development, their flexibility and adaptability are crucial to maintaining industry competitiveness. With the advent of the digital era, it's only by accelerating their digitalization that SMEs can adapt to deal with changing market competition.

**The government supports digital innovation in industries and also promotes net-zero and sustainable transformation**

To help move industry digitalization forward in Taiwan, the government supports SMEs to meet their needs and the cloud generation challenges they face in relation to digital talents and skills and transformation plans. Such efforts aim to create more digital transformation success stories, which can in turn lead to the export of digital innovation solutions.

With the global trend of ESG becoming increasingly prominent in recent years, digital strategy has become a key contributor to net-zero transformation. As a part of this green revolution, the government has set 2050 net-zero targets based on technology research and development and climate

change regulations, with the goal of driving a comprehensive transformation of energy, industry, life and society. Looking ahead, for enterprises to establish sustainable businesses in the international arena, growth prospects will increasingly depend on the results of their green digital transformations.

**Public-private partnerships connect policy resources and corporate needs to help achieve digital transformation**

Now is a crucial time for enterprises to invest in digital transformation and become more innovative. Besides continuously providing key resources to help enterprises with their transformation efforts, the government also encourages industry think tanks, academia and research institutes to collaborate and motivate local enterprises through publishing research and case studies on digital transformation, with the goal of realizing more digital transformation achievements with Taiwanese characteristics through concerted efforts.



Yeh Jer-liang (Andrew Yeh)  
Executive Secretary  
Board of Science and  
Technology,

# Foreword

Digital transformation is a major trend brought about by rapid technological development. New technologies such as AIoT, blockchain, cloud, data analytics and 5G have emerged in recent years, along with the accelerated development of multiple application models due to the COVID-19 pandemic. For enterprises, the pursuit of digital transformation to seize new opportunities is an urgent survival issue. Therefore, the government will continue to improve Taiwan's digital ecosystem and help enterprises with their transformation. As SMEs account for 98.9% of all enterprises in Taiwan, as well as 80.9% of total employment, they are the cornerstone of Taiwan's industrial development and an important focus of the government's guidance related to digital transformation.

## The government continues to develop the digital ecosystem to help SMEs maintain their transformation momentum

Taiwan's digital environment has been recognized by international organizations in recent years. For instance, the World Economic Forum ranked Taiwan as one of the top four innovative economies in the world in 2019, and the Institute for Management Development in Switzerland ranked Taiwan as the 8th most digitally competitive country in its 2021 World Digital Competitiveness Ranking, with both highlighting Taiwan's strong innovation and digital capacity.

In order to enhance Taiwan's digital and technological competencies, the government has adopted various policies to improve the digital ecosystem, support SMEs with digital transformation, develop digital talent, promote digital innovation applications and provide other transformation resources, working together with SMEs to move forward.

## Diverse resources for business transformation

SMEs face higher risks in digital transformation than larger enterprises due to their limitations in planning capabilities, digital skills and resource scale. According to PwC's 2021 Taiwan SME Digital Transformation Survey, more than 80% of SMEs face three major challenges in the transformation process: a lack of digital skills and talents; inexperience of carrying out digital transformation by stages; and not knowing the best transformation practices in their industries.

The government therefore provides a variety of policy resources to reduce the burden of transformation on SMEs. For example, the Digital Youth and Talent Development Program, which connects young trainees with practice areas, has trained thousands of digital talents to provide motivation for enterprises to transform themselves. The government also provides R&D funds to SMEs, encouraging them to engage in innovative research and development and to leverage cloud technologies for their digital transformation.

Moreover, the government provides digital transformation guidance and success stories, promotes TCloud and mobile payments, and provides more than 900 cloud solutions suitable for SMEs. In these ways, the government helps micro, small and medium enterprises improve their digital operations capacity and advance their digital transformation.

## Government is the best partner for digital transformation

The government provides strong backing to SMEs to start and grow their businesses. It also provides SMEs with opportunities to take their first steps towards sustainable transformation through net-zero carbon reduction and energy saving efforts, in line with international trends. In

addition, the government has established industry clusters and startup ecosystems in the northern and southern parts of Taiwan as part of efforts to encourage digital transformation for growth. In view of current digital trends and the goal to seize digital business opportunities, the government will continue to collect feedback from across different industries and help develop new strategies for digital transformation by SMEs.

Looking ahead, the government will continue to support Taiwan's SMEs through policies and resources, enhance the business environment for sustainable development, and work with likeminded partners to tackle the many challenges that SMEs face on their digital transformation journey.



Ho Chin-tsang  
Director General  
Small and Medium  
Enterprise  
Administration  
Ministry of Economic Affairs

何晉滄





## Key survey figures

The main challenges for SMEs in the digital transformation process:

47.1%

Lack of digital skills and talents

41.7%

Not knowing how to transform by stages

33.6%

Not knowing best industry practices

The key objectives of digital transformation for SMEs in different industries:

Wholesale and retail

58.1%

Expand market growth

Hospitality and food and beverage

45.3%

Provide better customer experiences

Metal products manufacturing

58.1%

Reduce operating costs

Machinery and equipment manufacturing

63.9%

Improve human resource management

Electronic components manufacturing

68.8%

Improve operating efficiency

Agriculture

53.0%

Reduce operating costs

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# How the SME transformation journey began

SMEs account for 98% of all business enterprises in Taiwan and around 80% of the total number of people employed. Most people rely for their livelihoods on SMEs, which are an important backbone support for domestic market growth.

The COVID-19 pandemic forced businesses to adapt to new consumption patterns and restructure their supply chains. At the same time, market competition has intensified as a result of accelerated digital progress and quicker development of applications. These major changes have helped push SMEs to start upgrading and transforming themselves digitally.

## The Covid-19 pandemic presented major challenges to Taiwan's SMEs in 2021

### Declining revenues and orders

Due to the COVID-pandemic, more than 80% of SMEs in Taiwan reported falls in revenue, and over 60% experienced fewer orders, according to a survey conducted by Taiwan's Economic Daily News in July 2021. The pandemic also directly affected sales revenues across several industries.

### Changing consumer patterns

The pandemic accelerated changes in consumer behavior patterns that are expected to continue afterwards. The changes are seen as permanent and business models are being challenged.

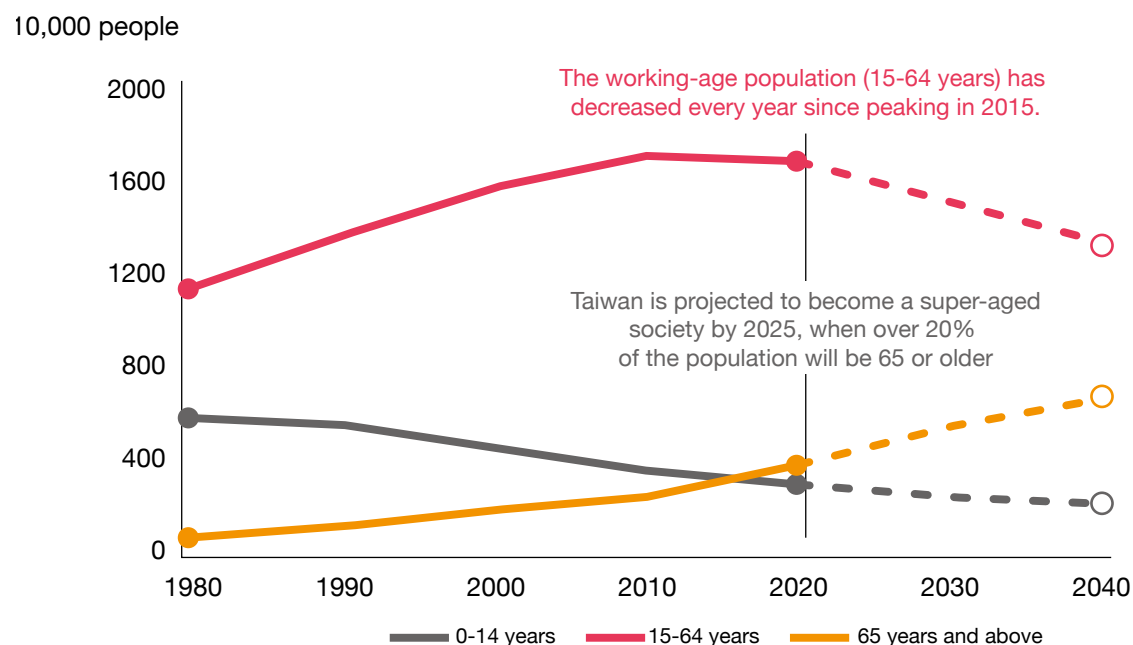
### Growing supply chain disruptions

Besides the short-term impact of the pandemic on supply chain operations, other factors such as global trade and geopolitical tensions, higher raw material and transportation costs, and increasing environmental awareness are also having a major impact on existing supply chain strategies.

## Faced with an aging society, low birth rates and a steadily shrinking workforce population, business enterprises need to adopt more digital applications and strategies to meet changing industry demands

Taiwan became an ageing society in 1993, an aged society in 2018, and is predicted to become a super-aged society by 2025, according to the National Development Council. Also, the working-age population (15-64 years) has been decreasing year on year since it reached a peak in 2015.

The decline in the working-age population makes it difficult for businesses to replenish their workforces. As a result, older senior employees remain in their jobs longer, but their productivity is lower due to ageing, notwithstanding their experience and knowledge. Looking ahead, enterprises will need to consider adopting more digital tools to help alleviate the pressures resulting from labor shortages and maintain the productivity of an aging working population.



Source: National Development Council, Population Projections for the R.O.C. (Taiwan): 2020~2070



# In this new era of challenges and uncertainties, enterprises are increasingly more determined to undergo digital transformation

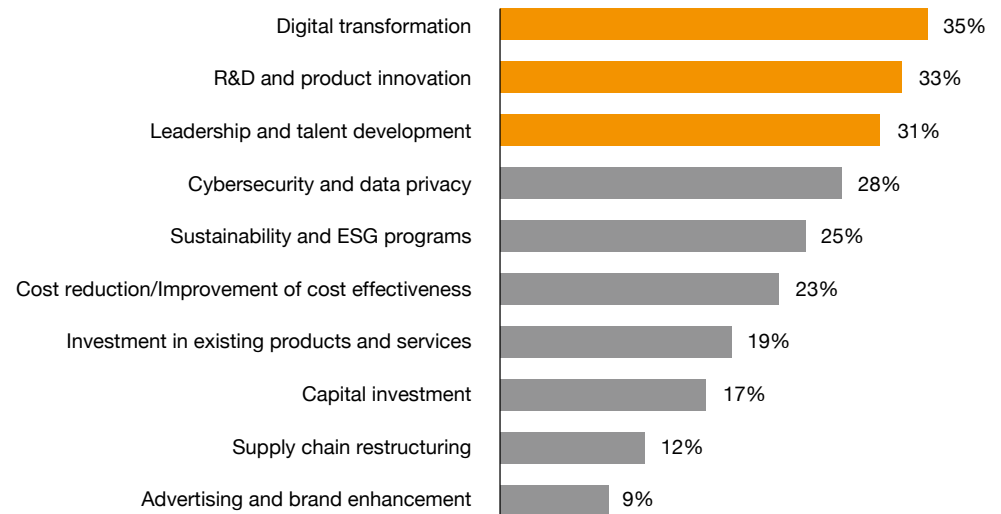
Digital transformation is a key competitive differentiator and so many enterprises are increasing their digital investments

In this new era of challenges and uncertainties, companies are more determined to engage in digital transformation. For many businesses, it's not just a matter of whether to do it or not, but more a case of what to do and how to do it.

PwC's 2021 Taiwan CEO Survey observed that digital transformation is a key competitive differentiator, with companies that laid a foundation for digitalization before the pandemic seen as being better protected against unknown risks than those that had failed to plan ahead.

In response to the COVID-19 crisis, 35% of Taiwanese business leaders said they would significantly increase their companies' investments in digital transformation over the next three years in order to maintain competitiveness.

Key areas of increased investment by Taiwan's companies in response to the COVID-19 crisis



Source: PwC's 2021 Taiwan CEO Survey

# **SMEs are aware of the necessity to undergo digital transformation but their goals differ across industries**

SMEs are becoming increasingly aware of the necessity to implement digital transformation within their businesses in order to survive and grow. However, their planning capabilities, digital skills and financial resources are limited and not as well established as for larger enterprises. Also, the goals of transformation differ from industry to industry. Moreover, it's a particular challenge for SMEs to comprehensively understand the current situation of digital transformation across different industries and the difficulties faced in the transformation process.

This survey report therefore seeks to explore the current status of and demand for digital transformation among SMES across six industries in Taiwan, including wholesale and retail trade; hospitality and food and beverage; metal products manufacturing; machinery and equipment manufacturing; electronic components manufacturing and agriculture. The survey findings are intended to serve as a useful reference for SMEs embarking on their digital transformation journey.





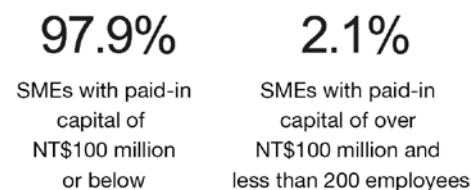
# Survey background

The SME population for the survey was selected based on the “Standards for Identifying Small and Medium-sized Enterprises” of the SME Administration under the Ministry of Economic Affairs, i.e., entities that have completed company or business registration in accordance with the relevant laws, and whose paid-in capital is no more than NT\$100 million, or have fewer than 200 employees.

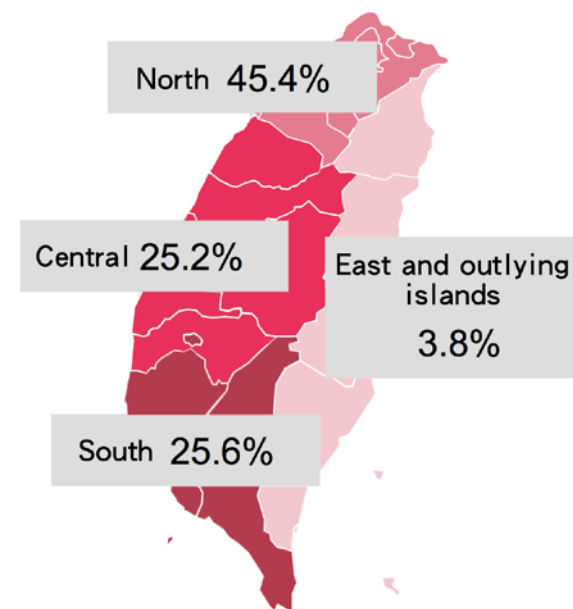
The selection of industries in the survey was based on the “Standard Industrial Classification” of the Directorate-General of Budget, Accounting and Statistics of the Executive Yuan, as well as the overall ranking of output value and number of enterprises. The survey was conducted via online questionnaire, and supplemented by telephone and e-mail follow-ups, and the response rate was proportional to the number of SMEs surveyed. A total of 3,233 Taiwan-based SMEs participated in the survey from August to October 2021, with the wholesale and retail trade industry accounting for 63.5% of all SME survey respondents, hospitality and food and beverage 15.6%, metal products manufacturing 13.4%, machinery and equipment manufacturing 2.6%, electronic components manufacturing 2.3%, and agriculture 2.6%.

The survey was mainly distributed to the member companies of key industry associations in Taiwan, the members of the PwC Taiwan Family Business NextGen Leaders Program, the subsidy program participants of the government’s Cloud Generation Project, and other companies in the database of China Credit Information Service, Ltd. (CRIF), which PwC engaged to conduct the survey.

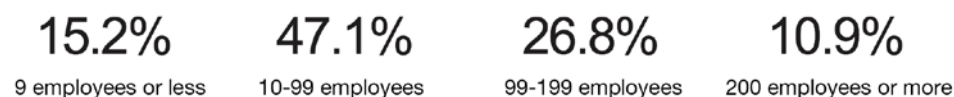
The distribution of the survey population sample is similar to the official data reported in the annual “White Paper on SMEs in Taiwan” by the SME Administration with regard to industry structure, geographic location and capital size. However, the distribution of surveyed SMEs by number of employees differed from the SME White Paper due to restricted distribution channels.



Distribution of surveyed companies by capital size



Distribution of surveyed companies by location



Distribution of surveyed companies by workforce size



## 01

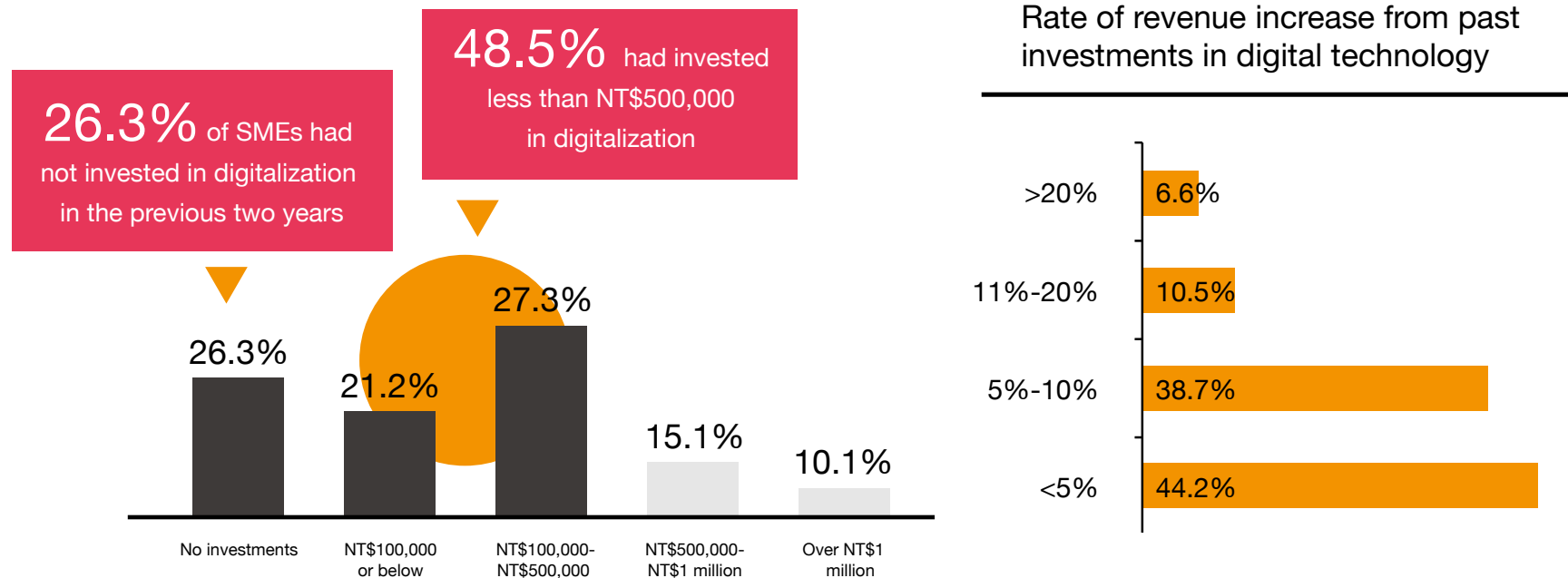
# SME survey profile

The main source of information about SMEs in Taiwan is the annual White Paper by the SME Administration under the Ministry of Economic Affairs. According to its 2020 White Paper, the number of SMEs reached 1.5 million in 2019 and accounted for 78.7% of all employed persons, while their total domestic sales totaled NT\$1,129.2 billion, or 34.8% of all domestic sales. Most people's livelihoods depend on SMEs, which are the backbone of Taiwan's domestic market.

Challenged by the COVID-19 pandemic, it is vitally important for SMEs to be able to flexibly use digital technology to reduce operating expenses, drive sales growth and further transform their businesses in order to survive and grow. This section introduces the overall survey profile, including the goals of digital transformation, the use of digital/cloud tools, the challenges encountered in the transformation process, and the related resources needed. It also analyzes the digital profile of SMEs, which is a useful reference for those looking to invest in digitalization and transformation.

## SMEs have limited resources for investing in digitalization and so mostly invest in partial digitalization, with room to grow digital investment returns

Most SMEs (48.5%) in the survey had invested less than NT\$500,000 (around US\$17,000) in digitalization, while 26.3% had not invested at all in digitalization over the past two years. Of those that had invested in digital technology, 44.2% earned a return on their investment of less than 5%, though some SMES have started to reap the benefit of digital investments, with 10.5% increasing their revenues by 11%-20% and 6.6% by more than 20%.





## SMEs expect digital transformation to help reduce costs and drive growth in the short run, and to help create new business models in the long run

The top three goals that surveyed SMEs say they currently wish to achieve through digital transformation are to expand market growth (47.3%), reduce operating costs (40.7%); and provide better customer experiences (40.6%).

When further asked about their digital transformation goals for the next three years, SMEs prioritized the provision of better customer experiences (33.9%), the creation of new business models (33.1%), reductions in operating costs (29.4%), and improvements in operational quality (29.4%).

Most SMEs expect digital transformation, in the short-term, to help reduce operating expenses and drive business growth. In the longer term, they hope it will bring about new business models and improvements in quality and services.

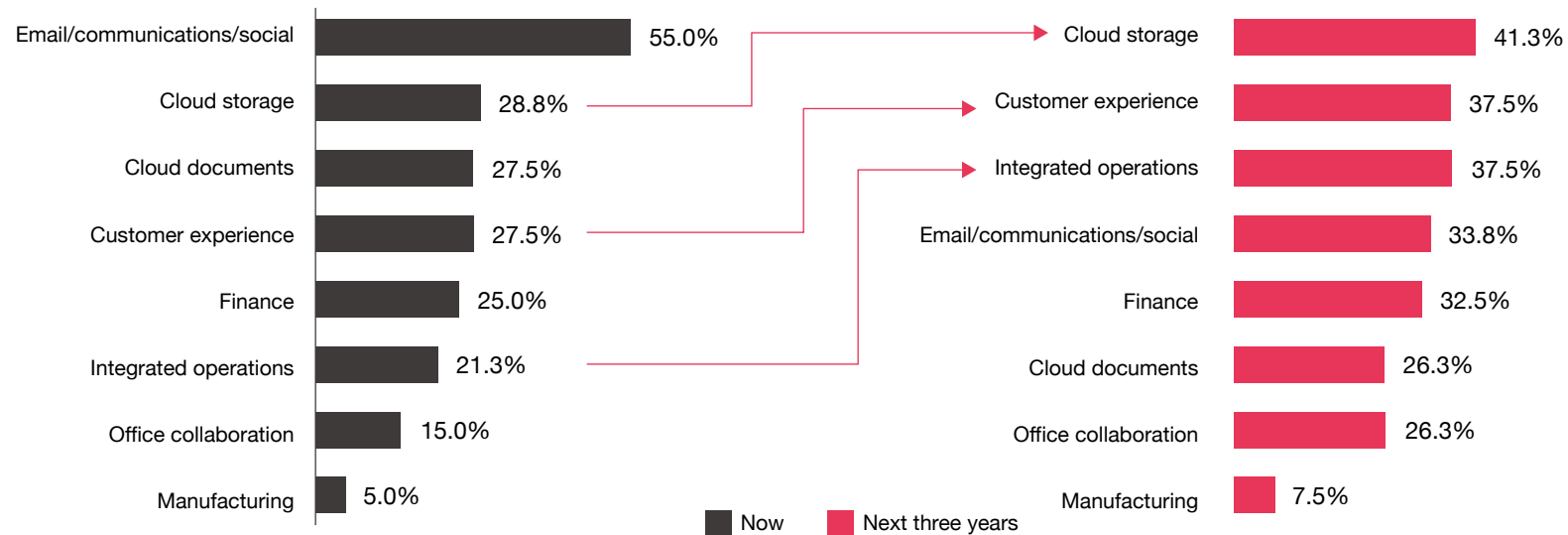
Q: What does your company wish to achieve through digital transformation?  
(You may select more than one answer)



SME survey population: Now = 3,233; Next three years = 3,233

## SMEs are currently focused on basic apps for their choice of cloud tools, but they intend to devote more attention to business apps in the future

The survey asked SMEs in each selected industry about their current use of and future needs for different digital and cloud tools. The digital tool categories used in the survey are based on Eurostat definitions. Basic applications include email, cloud storage and cloud documents, while advanced business applications include customer experience, integrated operations, finance, office collaboration, and manufacturing processes (see the note below for more information).



Note: Customer experience (e.g., online store, digital marketing, CRM, etc.), finance (e.g., POS, cloud invoicing, mobile payments, etc.), integrated operations (e.g., sales and inventory management, ERP, etc.), office collaboration (e.g., mobile office, HR systems, etc.), manufacturing processes (e.g., IIoT/IoT, smart scheduling, production cloud, etc.)

# The main challenges encountered in the transformation process include a lack of digital talents, transformation experience and industry best practices

The survey asked SMEs to identify the main challenges (from a list of ten) they've encountered during the digital transformation process. The majority (81%) said they had faced at least one challenge, with the main challenges including a lack of digital skills and talents (47.1%), inexperience of carrying out digital transformation by stages (41.7%), and not knowing the best practices of their industries (33.6%).

The lack of digital skills and talents is a key concern for SMEs looking to transform themselves digitally. Ministry of Education data shows the annual number of tertiary graduates in Taiwan has been falling in recent years, meaning there are fewer available young digital talents and information and communication technology (ICT) professionals to keep up with industry demands. SMEs should therefore seek to train and promote outstanding talents from within to address digital talent shortages.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



47.1%

Lack of digital skills and talents



41.7%

Not knowing how to carry out digital transformation by stages



33.6%

Not knowing the best practices of the industry



28.8%

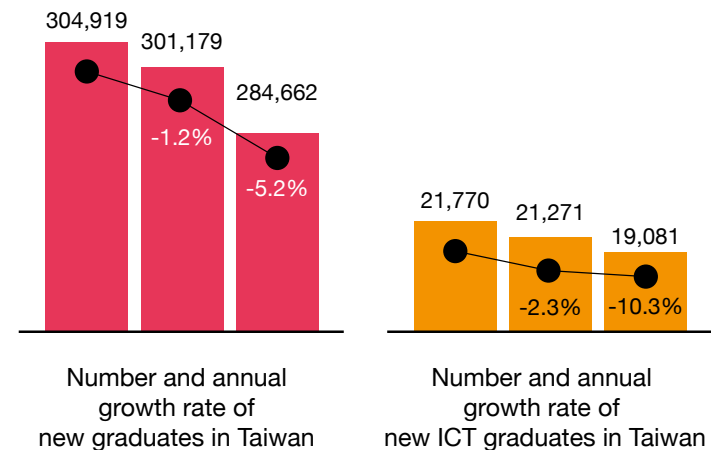
Lack of digital awareness among users



32.2%

Lack of in-depth analysis of customer and market data

The number of new graduates in Taiwan is falling every year, which means there are fewer young digital talents and ICT professionals to keep up with labor demand from industries.



Numbers and annual growth rates of college and university graduates and ICT graduates for the academic years 2017 to 2019.  
Source: Department of Statistics, Ministry of Education, 2022



## Besides internal training and promotions to address digital talent shortages, SMEs also expect the government to provide talent training programs

SMEs need supplementary resources to help them overcome transformation challenges. Due to their limited resources, they should consider their industry's characteristics and business models and then prioritize the resources to be pursued during the transformation process.

Regarding the resources they need to achieve digitalization in the future, SMEs said they most urgently need government-sponsored programs for talent development (28.6%), comprehensive transformation case-studies (23.8%) and talent-matching support (18.8%).

A lack of digital skills and talents is a key challenge facing SMEs in the transformation process. To increase the likelihood of a successful case, SMEs should not only continuously train and promote outstanding talents from within, but also seek to leverage government resources in the short term to replenish talents with the requisite knowledge and skills.

Q: What resources does your company need to achieve digitalization in the future?  
(You may select more than one answer)



28.6%

Government programs for talent development



23.8%

Comprehensive transformation case studies



18.8%

Talent-matching support



18.5%

Industry-academia collaboration assistance



18.1%

Digital tools



# SME digitalization profile

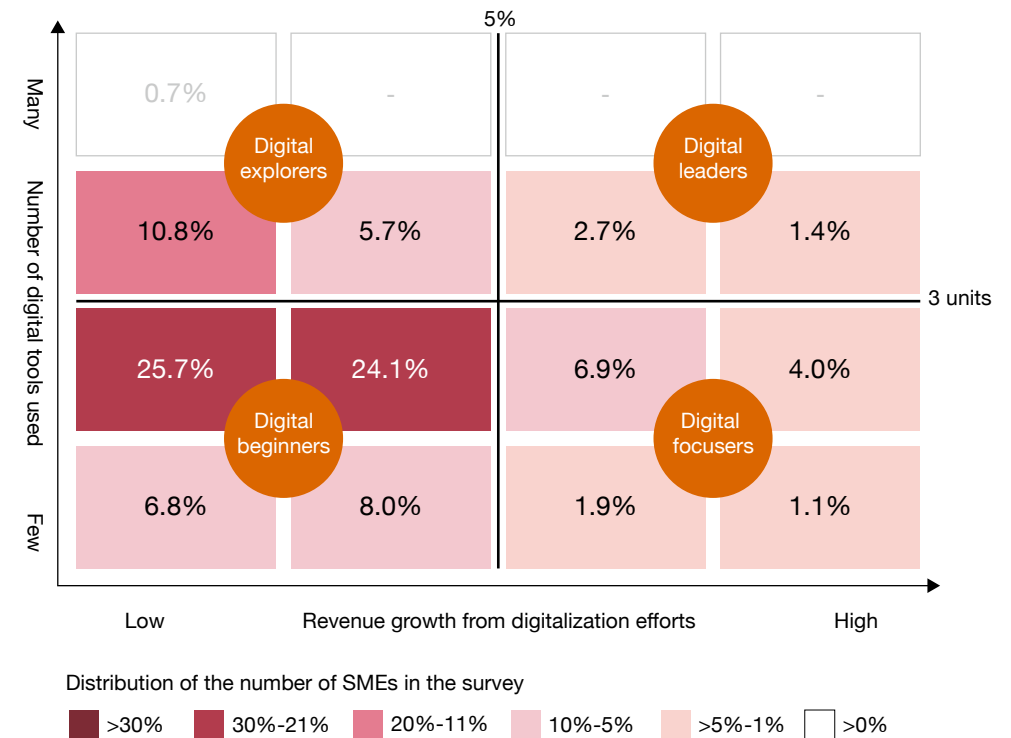
The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders based on the number of digital tools they use and the proportion of revenue growth derived from their digitalization efforts.

**Digital beginners:** These SMEs have adopted a small number of basic digital tools to maintain their daily operations, but they see limited benefits from digitalization. The majority (64.6% ) of SME respondents fall into this category.

**Digital explorers:** These SMEs are open-minded and have tried various digital tools for root cause problems, yet they see digitalization as generating limited benefits for them. Some 17.2% of the SME respondents fall into this category.

**Digital focusers:** These SMES use specific digital tools to align with their operational and strategic needs as well as to bring stable benefits to their business. Some 13.9% of the SME respondents fall into this category.

**Digital leaders:** Having achieved initial success with digital tools, these SMES continue to strengthen their digital innovation capabilities and replicate their successes in other areas. Just 4.1% of the SMEs fall into this category.



Note:

The number of digital tools used are grouped by quartiles: 0-1, 1-3, 3-7 and 7-10.

The percentage of revenue growth contributed by digitalization efforts is based on the median value of the percentage range, which is 0-3%, 3%-5%, 5%-7%, 7%-10%.









## 02

# Wholesale and retail trade industry

Rapid changes in consumer habits and the market environment have led to the significant growth of online shopping in Taiwan. Online retail sales increased from NT\$228.3 billion in 2017 to NT\$341.9 billion in 2020, according to the Ministry of Economic Affairs, and rose by a record year-on-year high of 25.9% in Q3 2021 due to changes in consumer behavior caused by the pandemic.

Taiwan is a high-potential market for online shopping given strong e-commerce penetration and experienced online consumers. Hence, many wholesalers and retailers have been considering how to shift from brick-and-mortar to online sales and from a product-oriented business model to a consumer-oriented one. However, cross-border e-commerce and overseas brands are also strong competitors, which has pushed local SMEs to accelerate the digitalization of their businesses.



## New digital era demands the creation of new experiences

In this new digital era, changing consumer demands and online sales models have brought a new competitive spark to the wholesale and retail trade industry. Many SMEs now look to create differentiated and innovative experiences in digital channels in order to generate more business.

PwC's 2021 Global Consumer Insights Pulse Survey found that the COVID-19 pandemic had created a new breed of consumers who prefer digital and value sustainability and are more willing to pay for healthy, environmentally-friendly products. The new consumer buying patterns are expected to remain and continue after the pandemic, which will require enterprises to more timely use data to understand their consumer profile and create experiences which reflect that profile.

Consumption patterns continue to change, with the 2021 Global Consumer Insights Pulse Survey finding that in the past 12 months, the percentage of consumers purchasing goods on smart devices rose from 24% to 41%, and the percentage of purchases in brick-and-mortar stores from 49% to 47%. As a result of these these paradigm changes, SMEs are starting to think about how to provide customers with a more convenient and contact-free shopping experience in the new digital age.

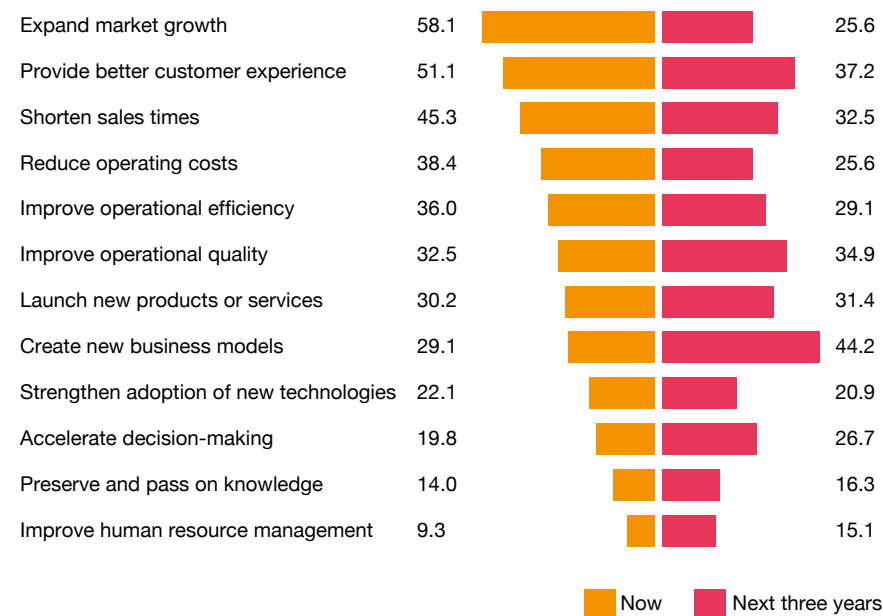
## Wholesalers and retailers expect to expand and compete in new markets through transformation as well as create more new business models

SMEs in the wholesale and retail trade industry say the top goals they wish to achieve at the present time through digital transformation are the expansion of market growth (58.1%), to provide better customer experiences (51.1%), and to shorten sales times (45.3%). Most of them expect to better compete by differentiating on experience and sales.

Regarding their digital transformation goals for the next three years, industry SMEs say they seek to create new business models (44.2%), provide better customer experiences (37.2%), and improve operational quality (34.9%).

Due to the emergence of new digital channels, wholesale and retail trade SMEs seek to quickly respond to market changes through digitalization. In the short term, digital investments will become standard as the digital consumer market matures. In the future, as competitive differences decrease, the objective of transformation will be to create new business models, which will become critical for SMEs.

Q: What does your company wish to achieve through digital transformation now and in the next three years? (You may select more than one answer)

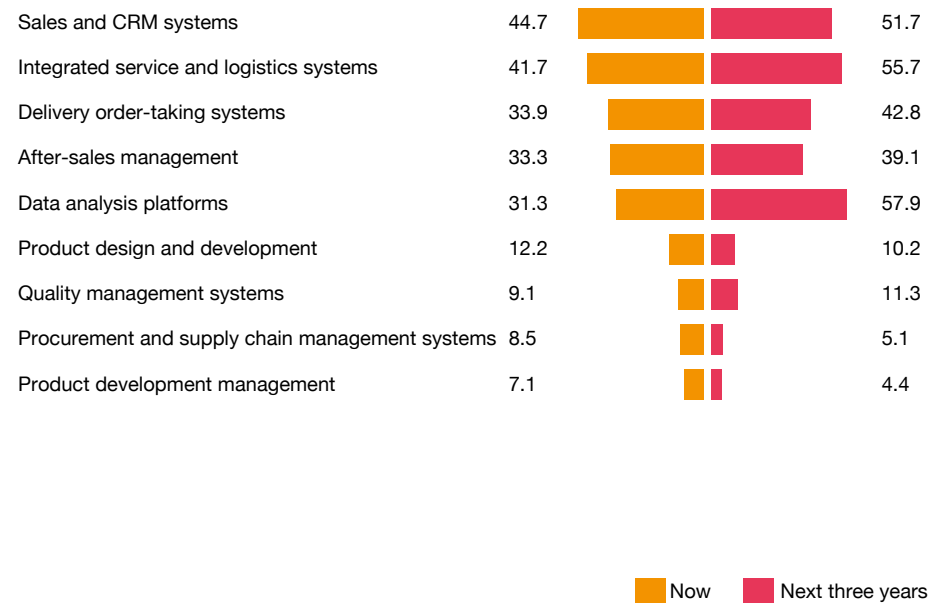


SME survey population: Now = 2,054; Next three years = 2,054



## Wholesalers and retailers currently use digital tools for sales purposes but will adopt more data apps for better customer management in the future

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)



SME survey population: Now = 2,054; Next three years = 2,054

### SMEs seek data insights to better understand consumer preferences and improve customer management

The top three digital tools that wholesale and retail trade SMEs currently use in their operations are sales and CRM systems (44.7%), integrated service and logistics systems (41.7%), and delivery order-taking systems (33.9%).

Looking ahead to the next three years, the top three digital tools they expect to use in their operations will be data analysis platforms (57.9%), integrated service and logistics systems (55.7%), and sales and CRM systems (51.7%).

The digital tools currently used by wholesale and retail traders in their operations are mainly for sales-related purposes. In the future, they will move more towards the use of data-based applications to optimize their service processes and operation models, understand consumer preferences, and conduct better customer management.

*Talent is a critical factor for the wholesale and retail trade industry to go online. We need to cultivate talents who know how to use digital tools in order to accelerate the enhancement of digital competencies.*

*Hsu Sheng-Chung, Secretary General  
Chinese Non-Store Retailer Association*

## Imminent shortage of digital skills and talents

In the survey, wholesale and retail SMEs said the lack of digital skills and talents (47.1%), inexperience of carrying out transformation by stages (41.7%), and not knowing the best industry practices (33.6%) were the key challenges they face in the transformation process. The most pressing issue is finding digital talents to quickly replicate industry practices and assisting SMEs with transformation in terms of use of digital tools, skills guidance and even blueprint planning.

Besides digital skills and talents, the lack of in-depth analysis of customer and market data (32.2%) is another important issue they face. This suggests that despite the growing ease of collecting data, SMES face difficulties in adopting a data-driven approach to analyze customer and market data, and this is a key challenge they need to break through in their transformation.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



47.1%

Lack of digital skills  
and talents



41.7%

Not knowing how to  
carry out  
digital transformation  
by stages



33.6%

Not knowing  
the best practices  
in the industry



32.2%

Lack of in-depth  
analysis of customer  
and market data



28.8%

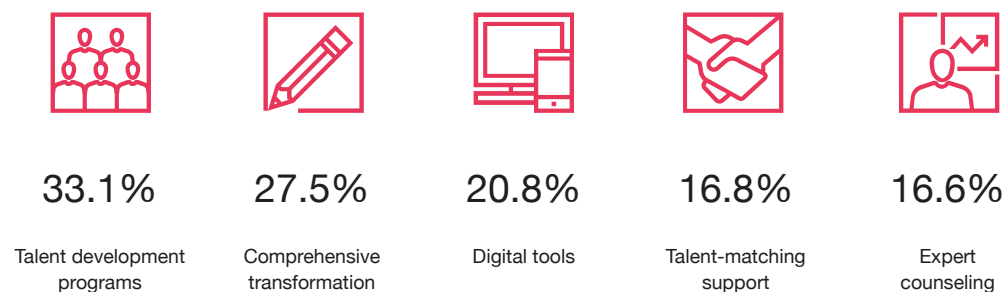
Lack of digital  
awareness  
among users

## The top resources SMEs say they need in order to achieve digital transformation are government programs for talent development, comprehensive transformation case-studies and digital tools

Wholesalers and retailers need more talent flexibility to adapt to a changing sales environment characterised by the ubiquitous use of mobile technology and the rise of online communities.

However, because of their limited scale, wholesale and retail SMEs want resource support to rapidly conduct digitalization, namely government programs for talent development (33.1%), comprehensive transformation case studies (27.5%) and introduction to digital tools (20.8%).

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answer)

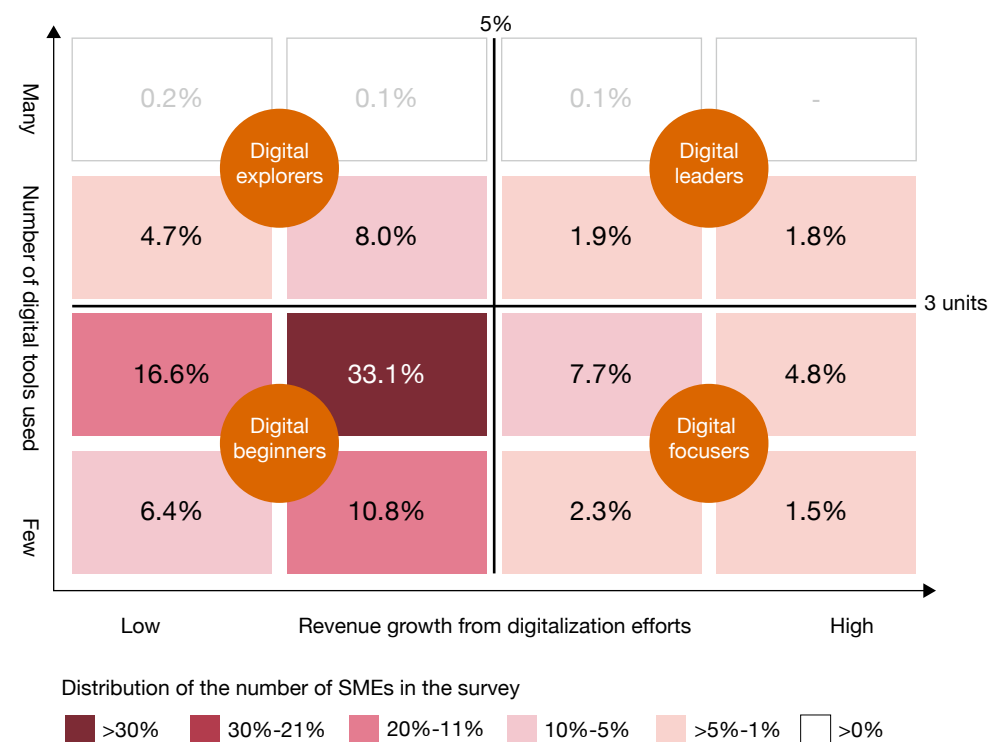


## The majority of wholesale and retail SMEs are digital beginners

The majority (66.9%) of wholesale and retail SMEs are considered to be digital beginners, since they only use a few digital tools for transformation, and they see limited revenue growth from their digitalization efforts.

Among these, however, 33.1% are regarded to be digital beginners, which show potential for shifting towards digital innovation, and are willing to try more digital tools or focus on specific tools to generate revenue growth.

The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.









## 03

# Hospitality and F&B industry

Negatively impacted by the COVID-19 pandemic, the overall revenue of Taiwan's hospitality and food and beverage (F&B) industry decreased by 24.8% in the May-August 2021 period compared with the same period in the year before, according to Ministry of Economic Affairs statistics. As a consequence, domestic F&B businesses have increasingly stepped up their digitalization efforts.

Demand for hospitality accommodation dropped significantly during the pandemic due to the lack of international visitors and the impact on domestic tourism. In response, many SMEs turned to automation to maintain the quality of accommodation services and reduce employee numbers.

Traditional brick-and-mortar operators in the F&B industry also had to cope changes in consumer habits caused by the pandemic, which gave rise to contact-free or minimum-contact consumption models. Consequently, many F&B businesses joined online delivery platforms and widely adopted digital ordering technologies to avoid minimise customer contact following the return of dining-in.



## Homogenized service delivery makes experience a key differentiator

During the COVID-19 pandemic, many SMEs in the hospitality and F&B industry started to provide more services through digital means in order to maintain their operations and gain a competitive advantage. The pandemic also prompted hospitality and F&B businesses to partner with third-party platforms, which will become a new sustainable business model as consumer habits change.

According to PwC's 2021 Global Consumer Insights Pulse Survey report, up to 90% of consumers will continue to use mobile and digital platforms as their primary method of consumption even after the pandemic is over, gradually shifting away from traditional in-store consumption habits.

The move toward digital platforms will lead to a high level of homogeneity in services as well as fierce competition in the hospitality and F&B industry. Providing a unique customer experience in the purchase and delivery process will be a key differentiator. For example, businesses could change from a product-centered sales culture to a customer-centered one by more quickly responding to customers' needs and designing member rebate systems to strengthen loyalty.

## F&B SMEs seek to create differentiated services through transformation and plan to accelerate their decision-making processes over the next three years

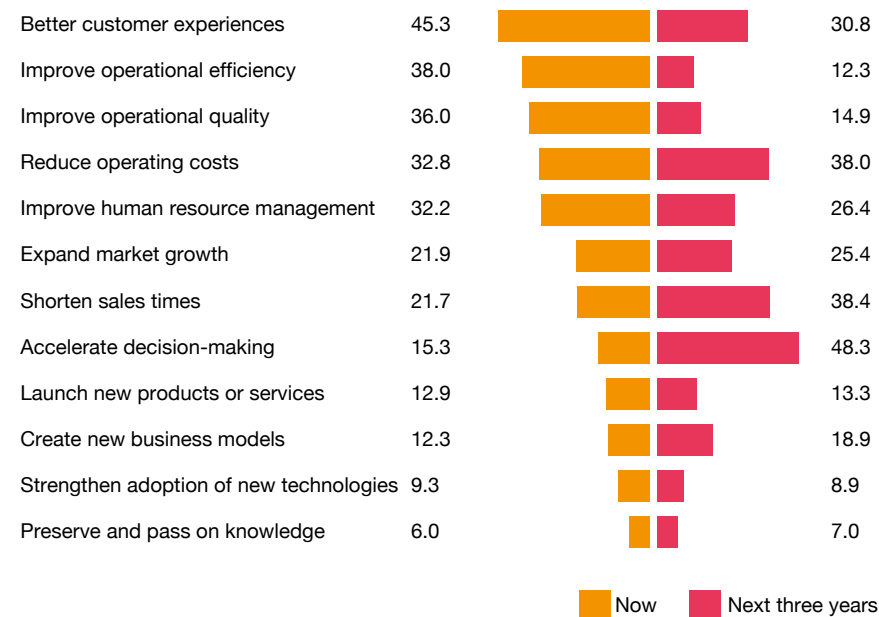
### From creating a better customer experience to faster decision-making and response

The top three goals that hospitality and F&B SMEs say they would like to achieve at the present time through digital transformation are better customer experiences (45.3%), improvement in operational efficiency (38.0%), and improvement in operational quality (36.0%).

When asked about their transformation goals for the next three years, they cited wanting to accelerate decision-making (48.3%), shorten sales times (38.4%), and reduce operating costs (38.0%).

Hospitality and F&B SMEs seek to use digital transformation in the short term to create differentiated experiences and improve operational efficiency, and to accelerate decision-making and sales performance over the longer term. The pandemic saw increased emphasis on customer responsiveness and sales performance in the industry, which will be a key area for SMEs to improve upon.

Q: What does your company wish to achieve through digital transformation now and in the next three years? (You may select more than one answer)

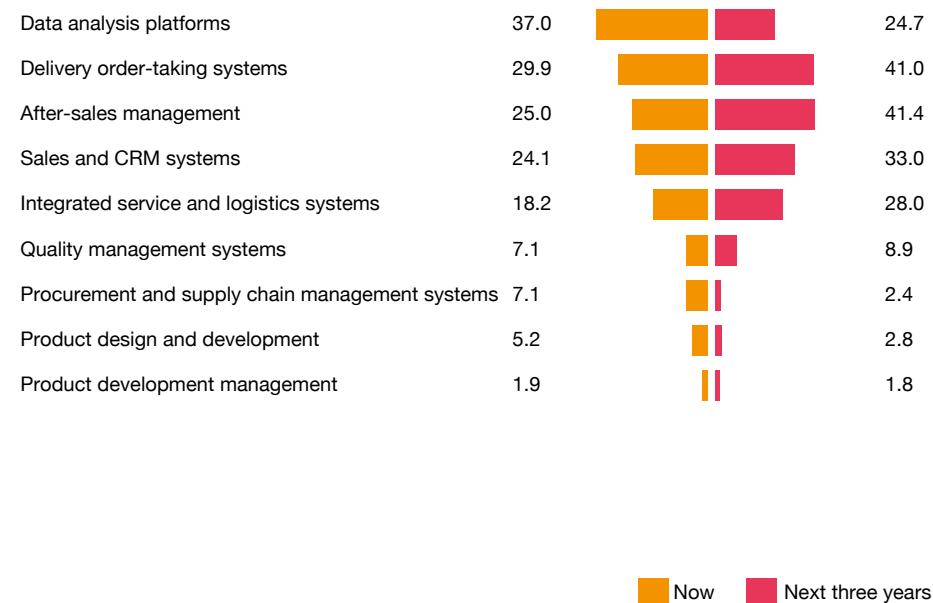


SME survey population: Now = 503; Next three years = 503



# Hospitality and F&B SMEs currently focus on customer data tools but will increase use of advanced apps to improve decision making and services

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)



SME survey population: Now = 503; Next three years = 503

The top three digital tools currently used by hospitality and F&B SMEs are data analysis platforms (37.0%), delivery order-taking systems (29.9%), and after-sales management (25.0%). In the next three years, the main tools used will be after-sales management (41.4%), delivery order-taking systems (41.0%), and sales and CRM systems (33.0%).

The hospitality and F&B industry will continue investing in customer-related digital tools (such as delivery order-taking systems, after-sales management) in the future. However, the use of data analysis platforms will likely decrease going forward as more third-party operators provide such services on an outsourcing basis to hospitality and F&B businesses.

*In the F&B industry, the customer experience used to exclusively occur on site and was in relation to the food served. But now with the emergence of digital technologies, the customer experience has expanded in different directions, building on good memories of the dining experience and creating uniqueness and trust.*

*Song Chin-Long, Representative of Aaron Kitchen*



## Inability to translate market data into decisions is a big challenge

SMEs in the hospitality and F&B industry say the major challenges they've encountered in the digital transformation process are the lack of in-depth analysis of customer and market data (33.8%), insufficient funding (30.4%), and the lack of digital skills and talents (19.3%).

The 2020 Business and Service Sector Digital Capabilities Survey by Taiwan's Institute for Information Technology found that 60% of hospitality and F&B businesses have data but no analysis, only 18.5% have professional analysts, and 50% have non-analysts who conduct some analysis. This shows there's still difficulties in turning data into useful professional information.

Hospitality and F&B SMEs are limited by their very size and mainly composed of employees who directly manage and serve customers, without many available resources to hire digital talents. But as an increasing amount of customer and market data analysis requires new digital tools, the businesses will face significant challenges during the digital transformation process.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



33.8%

Lack of in-depth  
analysis of customer  
and market data



30.4%

Insufficient  
funding



19.3%

Lack of  
digital skills  
and talents



18.7%

Not knowing  
the best practices  
in the industry



16.3%

Not knowing how to  
carry out digital  
transformation  
by stages

## The key transformation resources needed are digital-ready talent matchmaking, industry-academia assistance and financial support

In response to the long-term impact of the COVID-19 pandemic, hospitality and F&B SMEs need digital-ready talents who can convert customer and market data into valuable information for decision-making, as well as to help make quicker adjustments in service delivery processes.

The SME survey respondents in the hospitality and F&B industry said the priority resources they needed to achieve digitalization in the future are talent-matching support (29.5%), industry-academia collaboration assistance (25.7%), and financial assistance/subsidies (22.8%).

Besides financial assistance, the other resources wanted by SMEs in the hospitality and F&B industry are in relation to digital talents and capabilities. In addition to being able to acquire these through industry-academia collaboration assistance, SMEs should also seek to establish other different channels to access digital talents and skills to help adapt to the trend of digitalization.

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answers)



29.5%

Talent-matching  
support



25.7%

Industry-academia  
collaboration  
assistance



22.8%

Financial  
assistance /  
subsidies



21.7%

Expert  
counseling



21.1%

Comprehensive  
transformation  
case studies

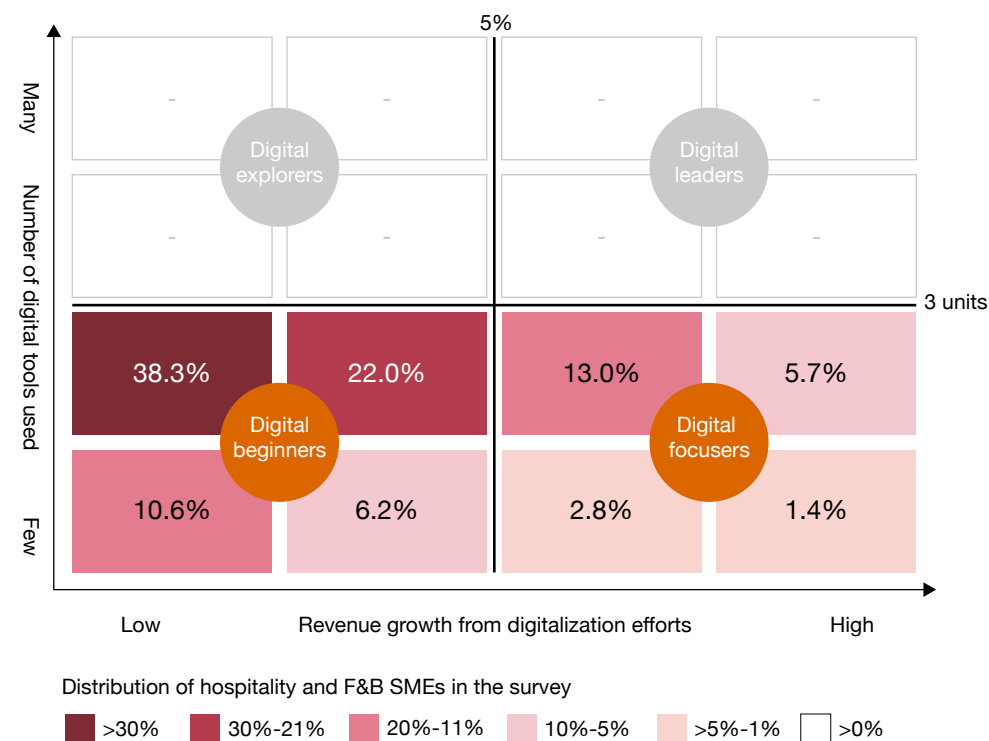


## Hospitality and F&B industry SMEs are predominantly digital beginners and digital focusers

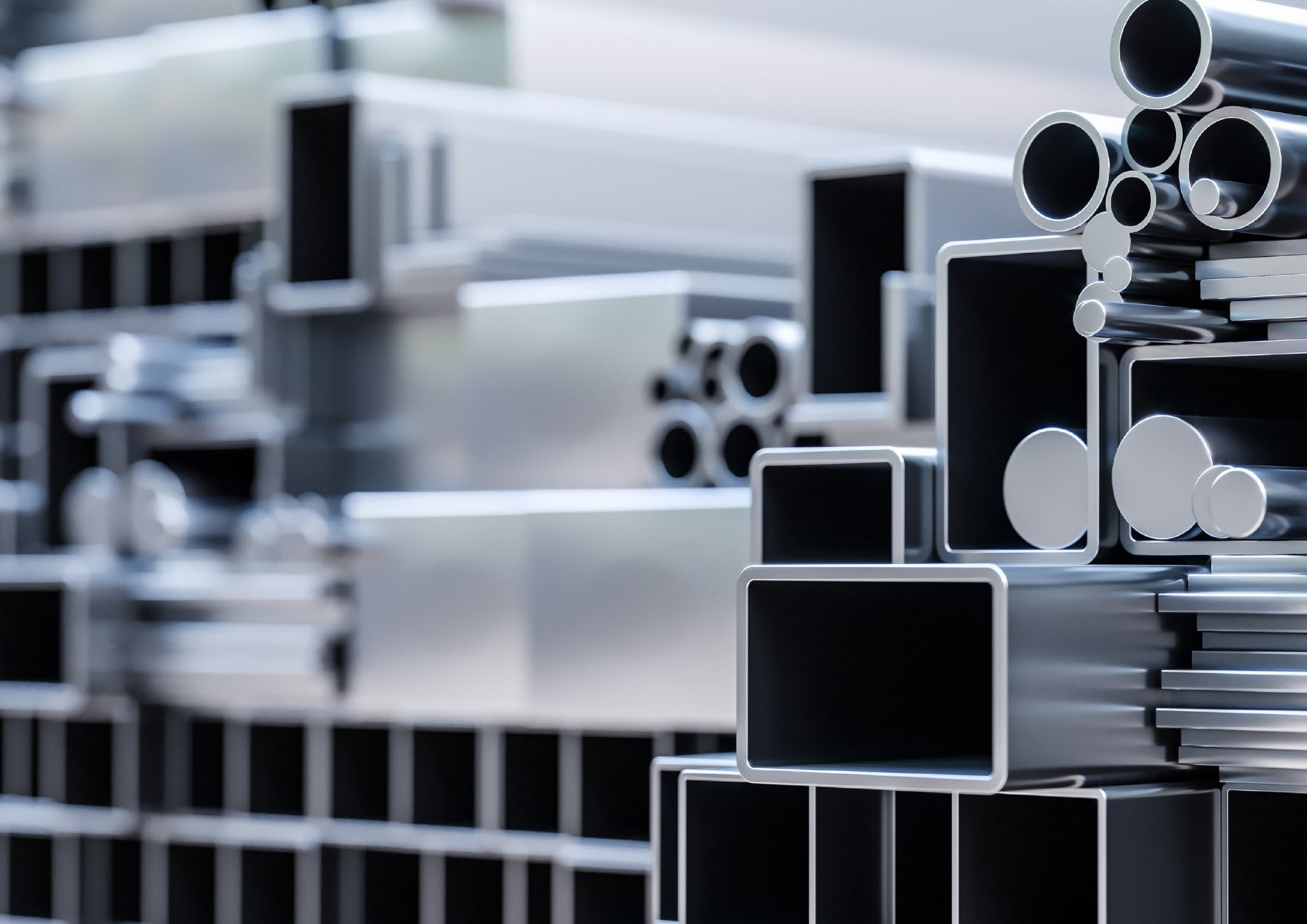
In the survey, 77.1% of SME respondents in the hospitality and F&B industry are classified as digital beginners, and 22.9% as digital focusers.

he pandemic accelerated digitalization efforts at hospitality and F&B SMEs, focusing on specific digital tools such as data analysis platforms, delivery order-taking systems and after-sales management systems, with the goal of providing better customer experiences and generating sales.

The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.









## 04

# **Metal products manufacturing industry**

Metal products manufacturing is a critical support to Taiwan's broader manufacturing industry. In 2019, it accounted for 24.7% of all domestic manufacturing, according to Ministry of Economic Affairs data. The Ministry of Labor's "Fourth Manpower Demand Survey" in 2021 said that, compared with the end of October 2021, manpower demand in the industrial sector was projected to increase by 35,000 workers by the end of January 2022, with a net increase of 33,000 in the manufacturing sector, including a net increase of 6,000 in metal products manufacturing.

A common perception of the metal products manufacturing industry is that its working environment is dangerous, dirty, tough and generally low-paying, which makes it unattractive to young workers and high-level talents. As a consequence, the industry faces talent and labor shortages. Therefore, the main objective of digital transformation in the industry is to improve manufacturing processes through digitalization as well as to create a working environment that attracts young workers.



## The goal of transformation is to facilitate more efficient operations

As the metal products manufacturing industry rarely interacts with the market directly, innovating business models is not considered a priority. The intended objective of digital transformation for SMEs in the industry is primarily to reduce operating costs and improve operating efficiency.

New IoTs, automated production equipment, and factory production management solutions have been introduced to improve the working environment and encourage people to join the industry. Only by reducing its reliance on labor through automation can the industry solve its challenges.

*“Taiwan’s metal products manufacturing industry is characterized by a large number of outsourced products, small quantities, and an array of diverse choices and B2B orders, which means that digital transformation is more of a challenge for this sector than for other types of manufacturing.”*

*Lin Chiu-feng, CEO  
Metal Industries Research & Development Centre*



# Metal products manufacturers aim to reduce operating costs and improve operational efficiency through transformation, and they will seek in the future to use digital tools to their improve human resource management

## Nurture human assets by improving operations

The top three goals that metal product manufacturing SMEs say they wish to achieve through digital transformation are the reduction of operating costs (58.1%), improving operational efficiency (41.2%), and expanding market growth (35.3%).

Regarding their digital transformation goals for the next three years, the SMEs again prioritized the reduction of operating costs (59.1%), then improving their human resource management (35.3%), and improvements in operational efficiency (30.3%).

Faced by labor shortages, metal products manufacturers seek to improve their manufacturing processes through digital transformation and reduce operating costs. In the future, they want transformation to improve human resource management and strengthen their workforce through automation to address labor and talent shortages.

Q: What does your company wish to achieve through digital now and in the next three years? (You may select more than one answer)

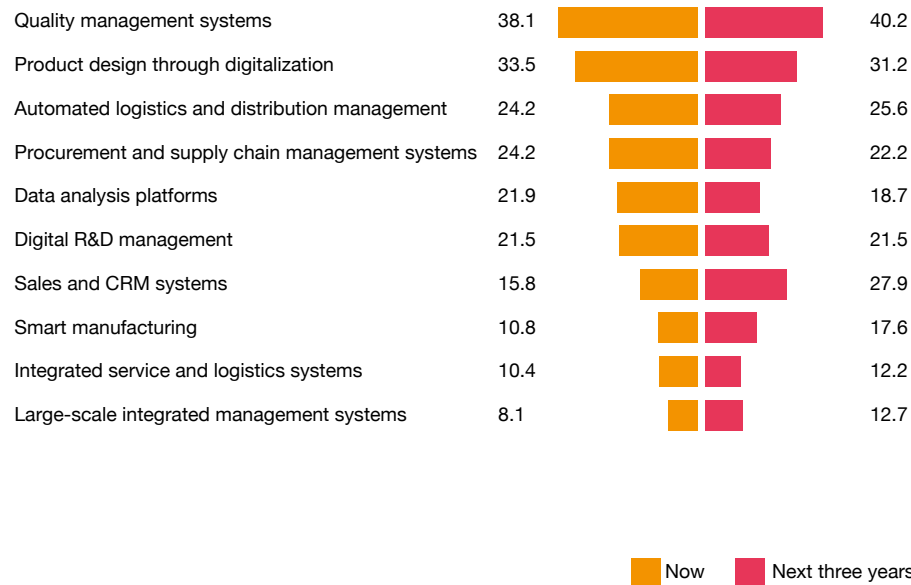


SME survey population: Now = 433; Next three years = 433



# Metal products manufacturers seek to capture experience-related habits and stabilize quality through quality management and product design digital tools

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)



SME survey population: Now = 433; Next three years = 433

## Digital tool focus on improving quality management and product design

The main digital tools that metal products manufacturing SMEs currently use in their operations are quality management systems (38.1%), product design through digitization (33.5%), automated logistics and distribution management systems (24.2%), and procurement and supply chain management systems (24.2%).

The main digital tools they expect to use in the next three years are quality management systems (40.2%), product design through digitalization (31.2%), and sales and CRM systems (27.9%).

In view of labor shortages in metal products manufacturing, it is important to replicate the working experience of long-term employees. Some SMEs seek to capture experience-related habits through digital tools for quality management and product design, and more digitalization and automation, in order to establish a stable quality foundation by recording and passing on workers' know-how and skills in the metal product manufacturing process through digital tools.

## Resistance to changes in the existing corporate culture is the biggest transformation challenge facing the industry

Metal products manufacturing SMEs say the major challenges they've encountered in the transformation process are resistance to change in the corporate culture (30.3%), lack of digital skills and talents (28.2%), and not knowing how to proceed with digital transformation (25.2%).

Taiwan's metal products manufacturing industry faces internal and external challenges in the transformation process. Internally, senior employees tend to be resistant to transformation because they are accustomed to operating by the rule of thumb and are unfamiliar with digital technology, believing that digitalization will bring limited improvement benefits or fearing they will be replaced. Externally, the industry's working environment is not an attractive proposition to young people, and so manufacturers face difficulties in bringing in new digital skills and talents.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



30.3%

Resistance to change in the corporate culture



28.2%

Lack of digital skills and talents



25.2%

Not knowing how to carry out digital transformation by stages



19.9%

Not knowing the best practices in the industry



17.1%

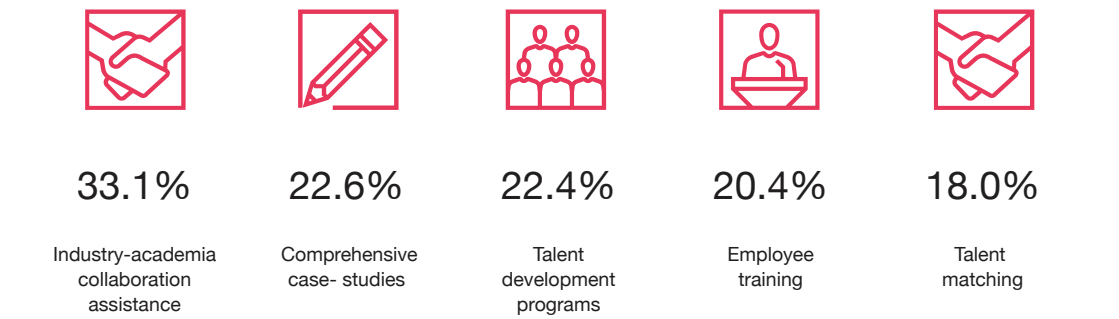
Lack of in-depth analysis of customer and market data

## Metal products manufacturers look to leverage industry-academia collaboration assistance and transformation case studies

Metal products manufacturers say the priority resources they need to achieve digitalization in the future are industry-academia collaboration assistance (33.1%), comprehensive trans-formation case studies (22.6%), and government programs for talent development (22.4%).

Due to the constraints caused by the nature of the metal products manufacturing industry, SMEs will need to hire more migrant workers in the short term, according to a 2020 survey on labor shortages in key manufacturing sectors by the Ministry of Labor’s Workforce Development Agency. In the long term, the industry will have to reduce its dependence on labor through digitalization by bringing in digital talents from various channels, cultivating existing employees’ digital skills, and building on successful cases to overcome resistance to digital transformation.

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answers)

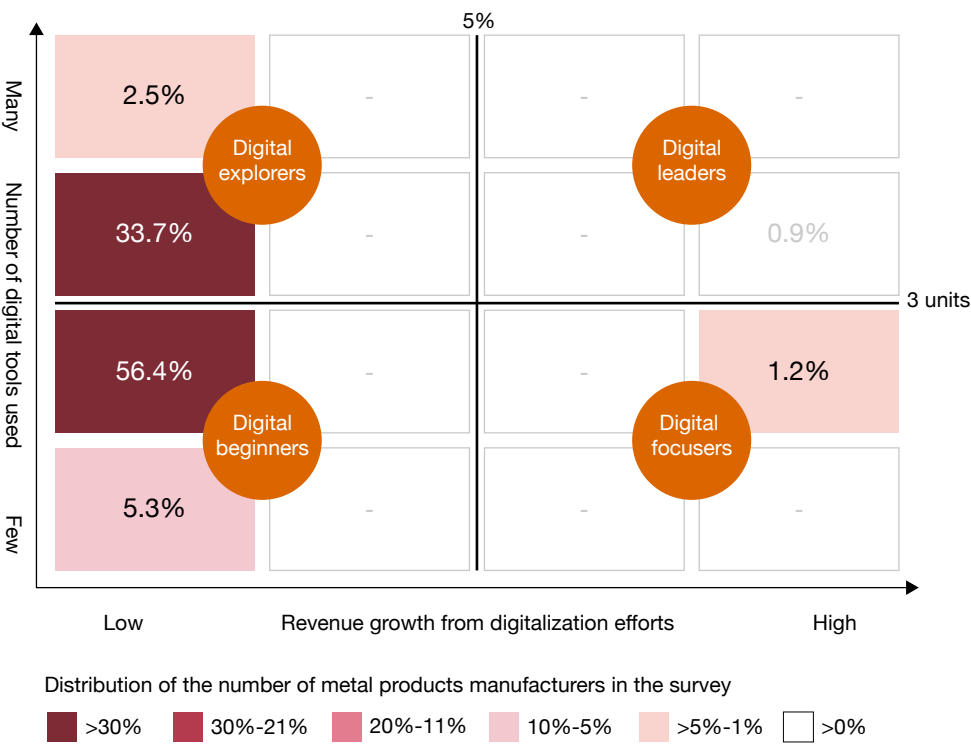


# SMEs in the metal products manufacturing industry are mostly digital beginners and explorers

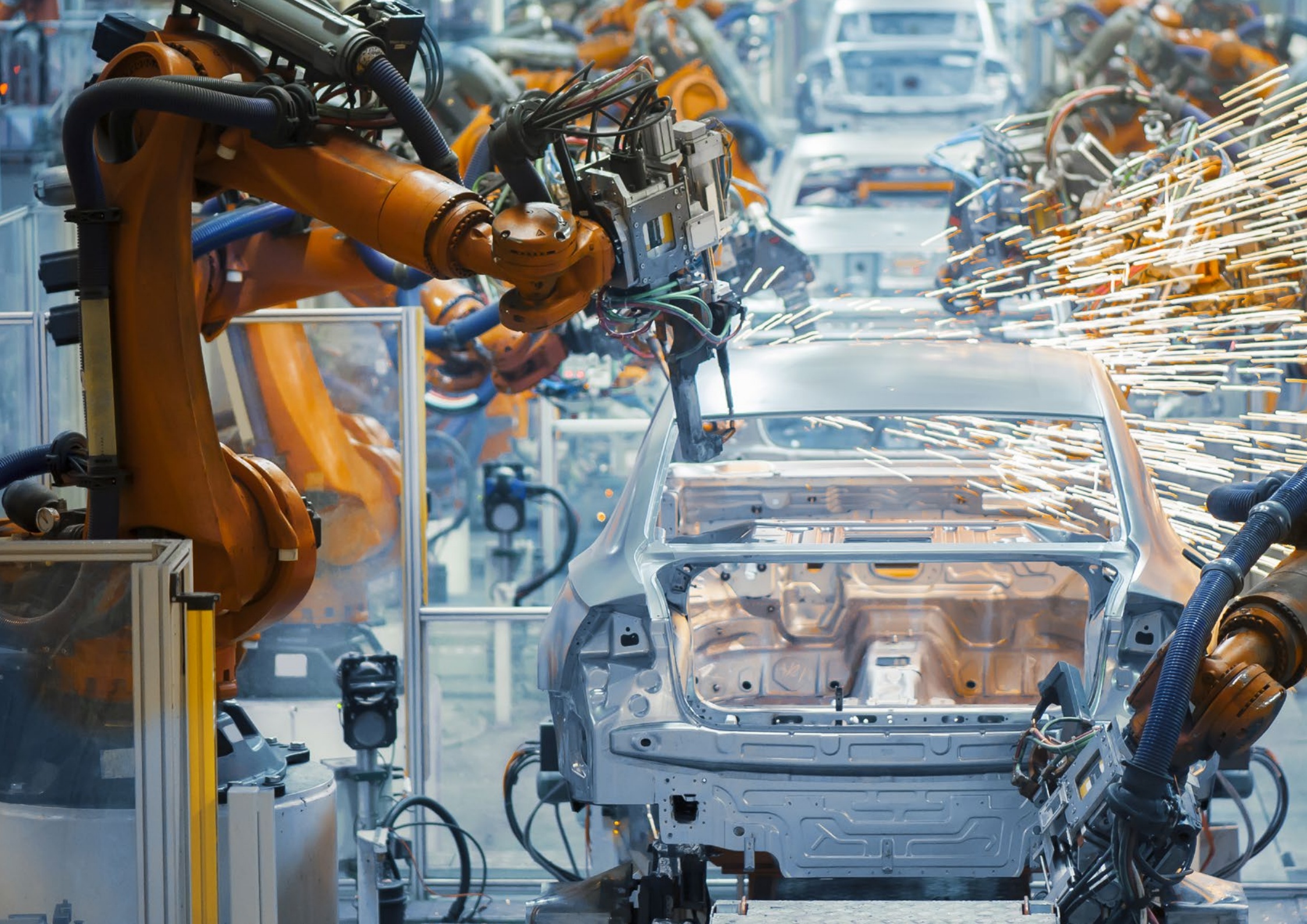
The majority (61.7%) of the metal products manufacturers in the survey are considered to be digital beginners, and 36.2% are digital explorers.

ompared to other manufacturing sectors, metal product manufacturers are generally resistant to digitalization and have been slower and more conservative in introducing digital tools. Even so, many SMEs are still looking to introduce more digital tools to optimize their processes and working environments in order to address cost and labor shortage issues.

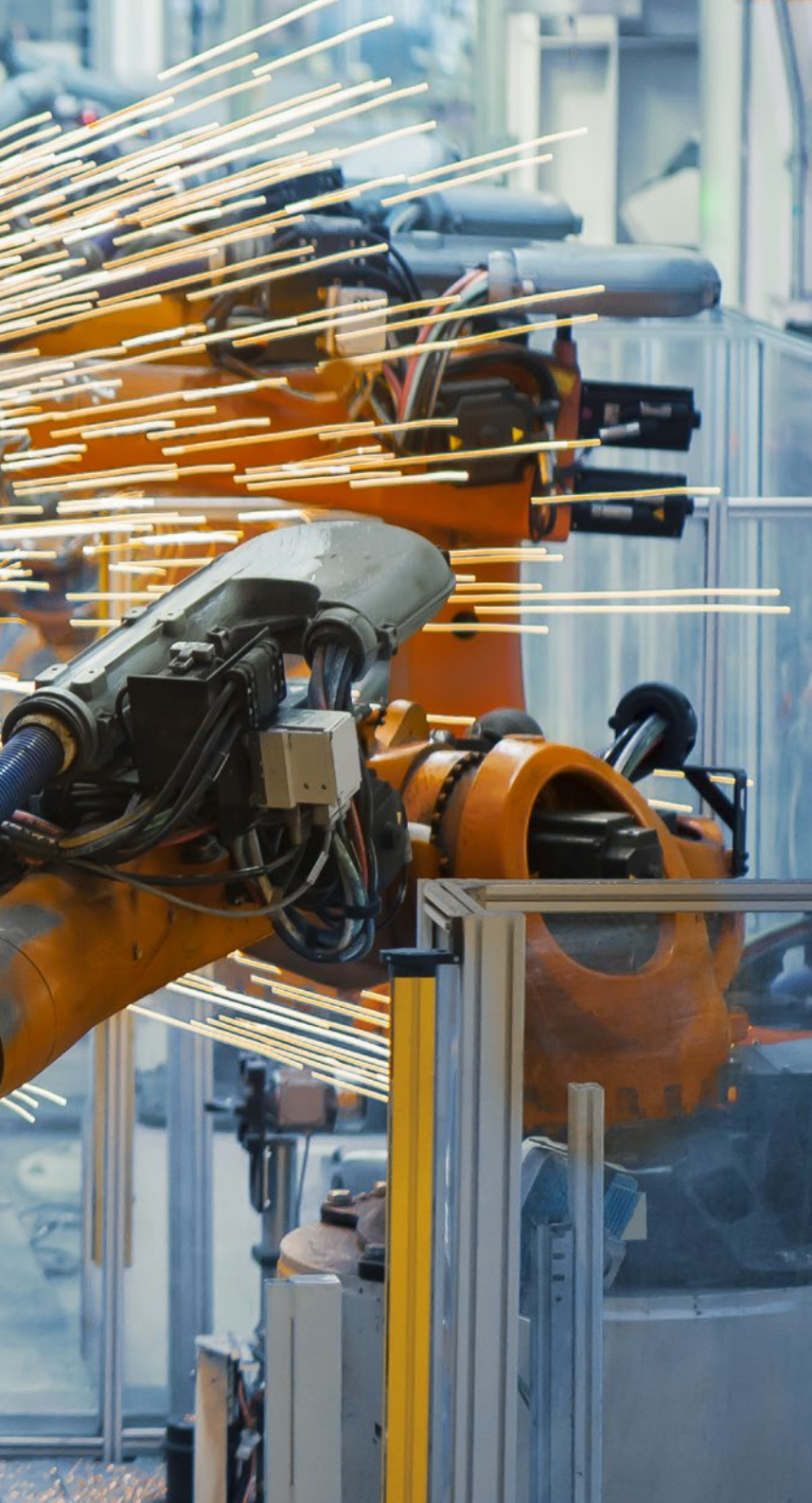
The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.









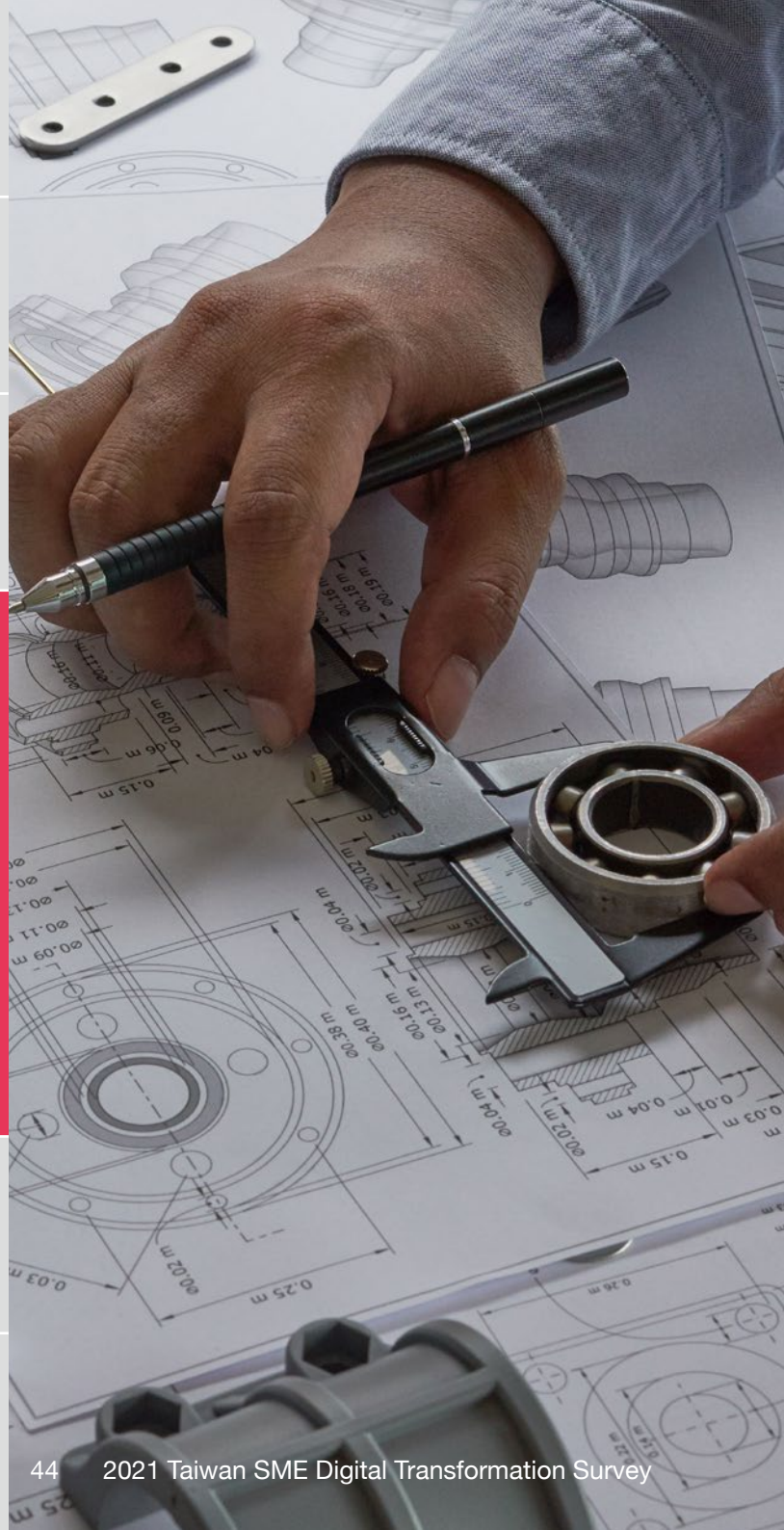


## 05

# Machinery and equipment manufacturing industry

The total production output value of the machinery and equipment manufacturing industry in Taiwan amounted to NT\$857.1 billion in 2020, accounting for 4.9% of overall manufacturing output, according to Ministry of Economic Affairs statistics. Typical products manufactured by industry operators cover eight categories: electronics and semiconductor machinery, metal cutting machine tools, mechanical transmission equipment, fluid machinery, transportation machinery, other metal processing machinery, textile and leather machinery, and plastics and rubber machinery.

In recent years, the industry has begun to undergo succession changes as ownership passes to next family generations. Improving human resource management, knowledge preservation and inheritance issues are important agenda items for SMEs in the industry. Taiwan's Industrial Technology Research Institute pointed out in its 2021 Machinery Industry Development report that around half of the country's medium and large machinery manufacturers have started to transform but most of them are still in the initial stages, and the percentage of SMEs engaged in digital transformation is even lower. Therefore, setting realistic transformation goals, conducting strategic management and clearly communicating with employees are of critical importance for SMEs.



## Passing on experience and knowledge through digitalization

Machinery and equipment manufacturers face the issues of second-generation succession and retirement of senior machinists. It will be critical to use digital methods to convert past experience and knowledge into reproducible parameters and standards for inheritance, but obstacles remain.

According to a March 2021 article by PwC Taiwan, titled “How manufacturing SMEs can become intelligent manufacturers,” most workers in traditional manufacturing rely on their experience and manual handwritten forms to report various production information. However, this approach limits management’s ability to make fast decisions for improvement. Therefore, establishing a foundation for data-based communications and decision-making is a first step towards digital transformation.

*Smart machinery has become an important strategy in response to the development of Industry 4.0 and smart manufacturing. However, it is difficult to recruit talents with skills in both information and communication technology and smart technology. By improving the digital capabilities of internal talents through internal and external training programs, so that they can operate smart machinery with human-machine interfaces, businesses can generate multiple benefits such as production safety.*

*Chen Po-Chia, Managing Director  
Taiwan Machine Tool and Accessory Builders' Association*

# Machinery and equipment manufacturers seek to overcome talent issues by improving human resource management through digital transformation

## Addressing longstanding challenges facing the industry through digitalization efforts

The top three goals that machinery and equipment manufacturers say they wish to achieve through digital transformation at the present time are improving human resource management (63.9%), reducing operating costs (50.6%), and preserving and passing on knowledge and experience (50.6%).

When further asked about their transformation goals for the next three years, they again cited improving human resource management (73.5%), reducing operating costs (62.7%), and preserving and passing on knowledge and experience (51.8%).

The current and future goals that machinery and equipment manufacturers seek to achieve through digital transformation are consistent. Their expectation is that it will help solve the long-standing challenges and difficulties that are facing the industry.

Q: What does your company wish to achieve through digital transformation now and in the next three years? (You may select more than one answer)

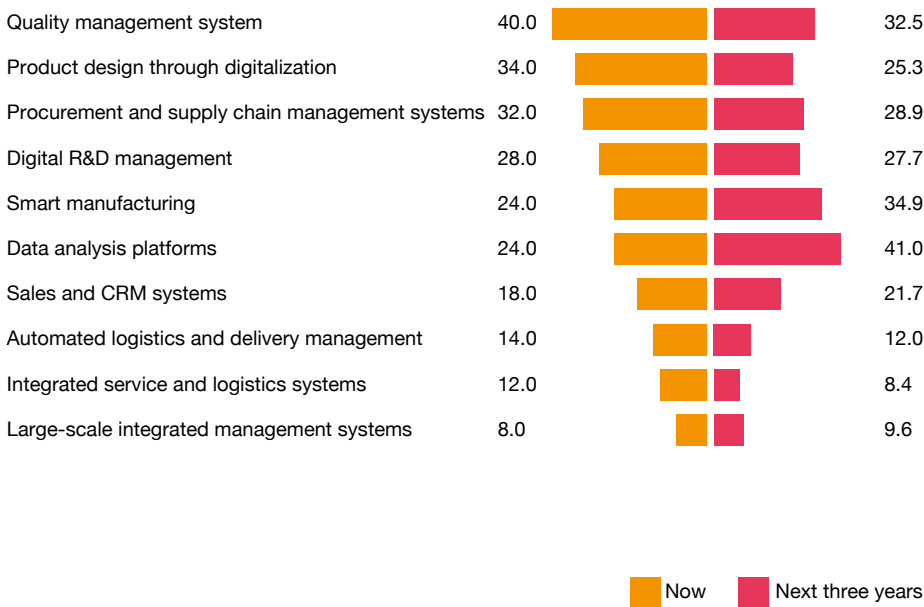


SME survey population: Now = 83; Next three years = 83



# Machinery and equipment manufacturers currently focus on quality management tools and aim to increase use of tools for data analysis and smart decision-making

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)



SME survey population: Now = 83; Next three years = 83

## Establish standards and reduce dependence on rule of thumb

The top three digital tools currently used by machinery and equipment manufacturers in their operations are quality management systems (40.0%), product design through digitalization (34.0%), and procurement and supply chain management systems (32.0%).

The top three digital tools that machinery and equipment manufacturers expect to use in the next three years are data analysis platforms (41.0%), smart manufacturing (34.9%), and quality management systems (32.5%).

Machinery and equipment manufacturers use digital tools to improve quality, increase R&D and production efficiency, enhance yield estimation and enable more accurate material preparation analysis. They also seek to adopt digital methods to convert knowledge and experience into reproducible parameters and standards. In the future, they aim to replace the rule of thumb of doing things with a data analysis-driven approach and transform their business models based on smart decision-making.

*AutoCam focuses on machine tool key component manufacturing, and the company faced internal resistance from employees as it sought improve its operations through digital transformation.*

*AutoCam recruited new employees to seed a digital transformation project, then used the data results to show the advantages of digitalization to convince senior workers to participate in the transformation process and reduce their resistance. It also used human-machine interaction outcomes to raise the digital awareness of all employees.*

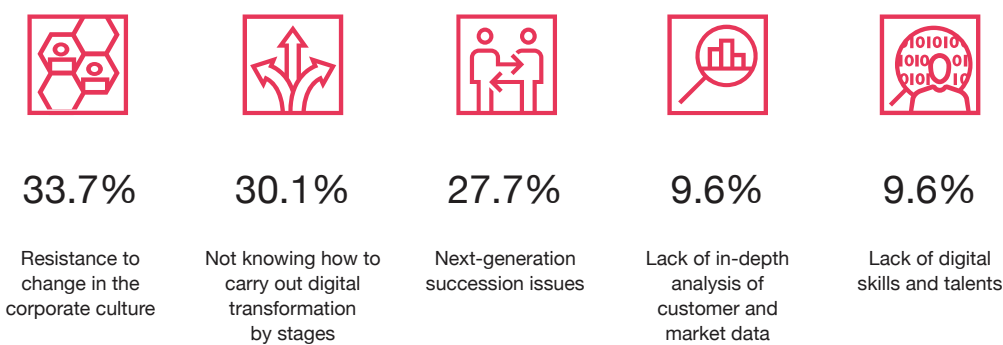
*Digital transformation case-study:  
AutoCam Technology Co., Ltd.*

## Resistance to change in the corporate culture is a major challenge for machine and equipment manufacturers

The main challenges encountered by machinery and equipment manufacturers in the transformation process are resistance to change in the corporate culture (33.7%), not knowing how to carry out transformation by stages (30.1%), and next-generation succession issues (27.7%).

Resistance to change in the corporate culture is a major concern for machinery and equipment manufacturers undergoing transformation. Given the prevalence of senior employees and a solidified corporate culture in their enterprises, it is important to demonstrate an initial success through small-scale transformation so that the resultant benefits can be recognised. The scope of digitalization should then be promoted and expanded so that the manufacturer’s employees would be willing to improve their work performance through digital tools, rather than resist.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)

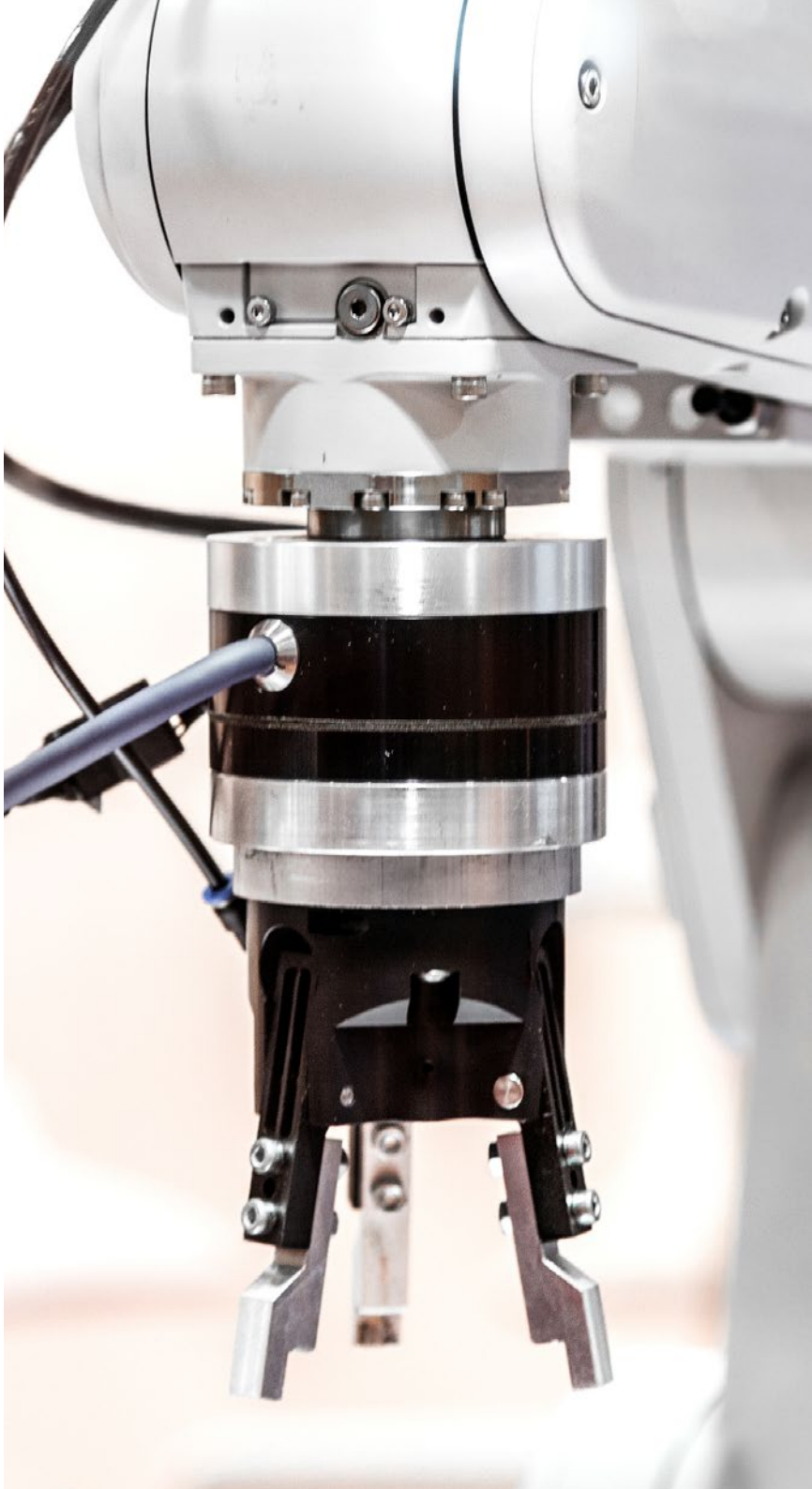
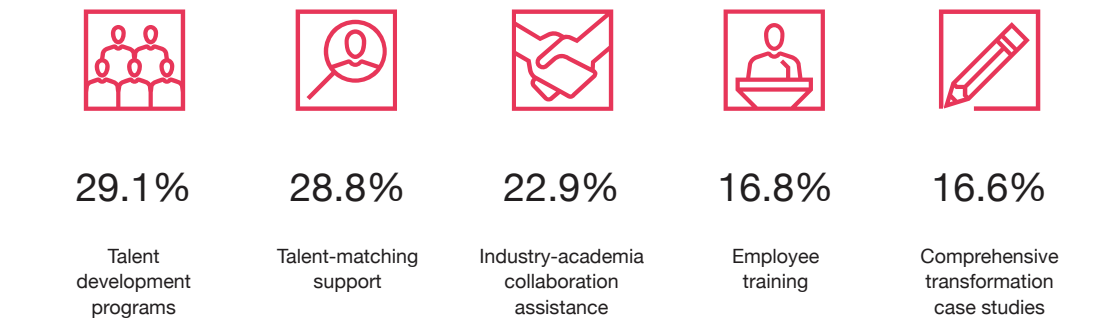


## The key resources needed by manufacturers are talent development support programs and industry-academia collaboration assistance

Machinery and equipment manufacturers say the priority resources they need to achieve digitalization in the future are government programs for talent development (29.1%), talent-matching support (28.8%), and industry-academia collaboration assistance (22.9%).

The resources they are looking for center around the need for accelerated talent thinking, internal-facing pressures of talent aging and inheritance issues, and external-facing issues around market expectations regarding product function enhancements. Digital transformation of the industry requires help with talent acquisition and skills cultivation, while industry-academia collaboration can contribute resources as well as the joint development of potential solutions.

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answers)

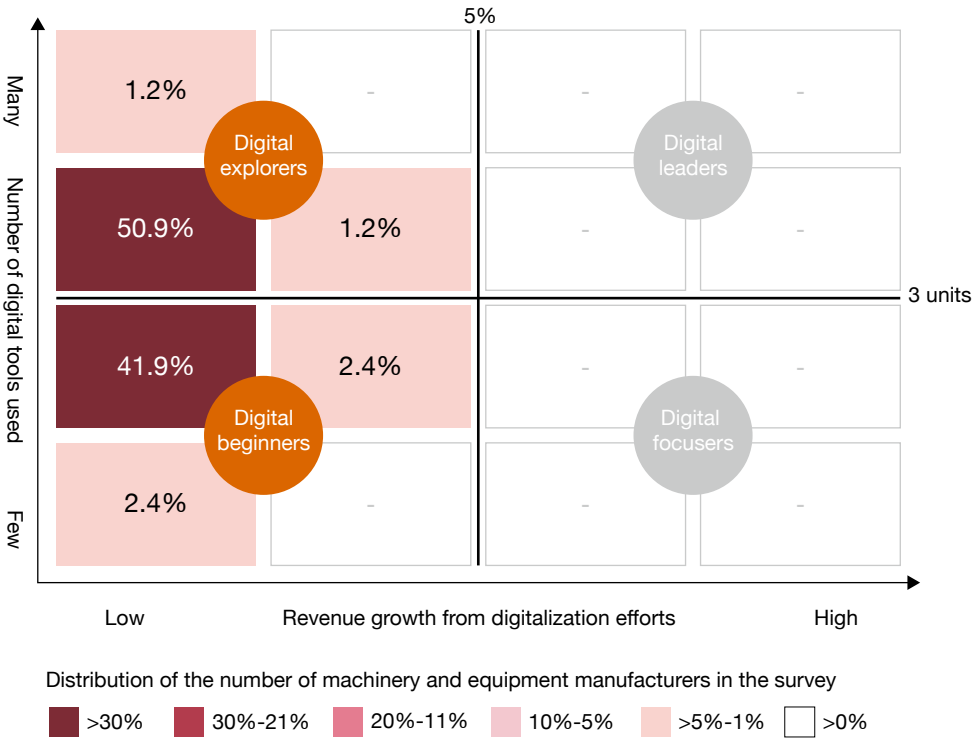


# Most machinery and equipment manufacturers are either digital beginners or digital explorers

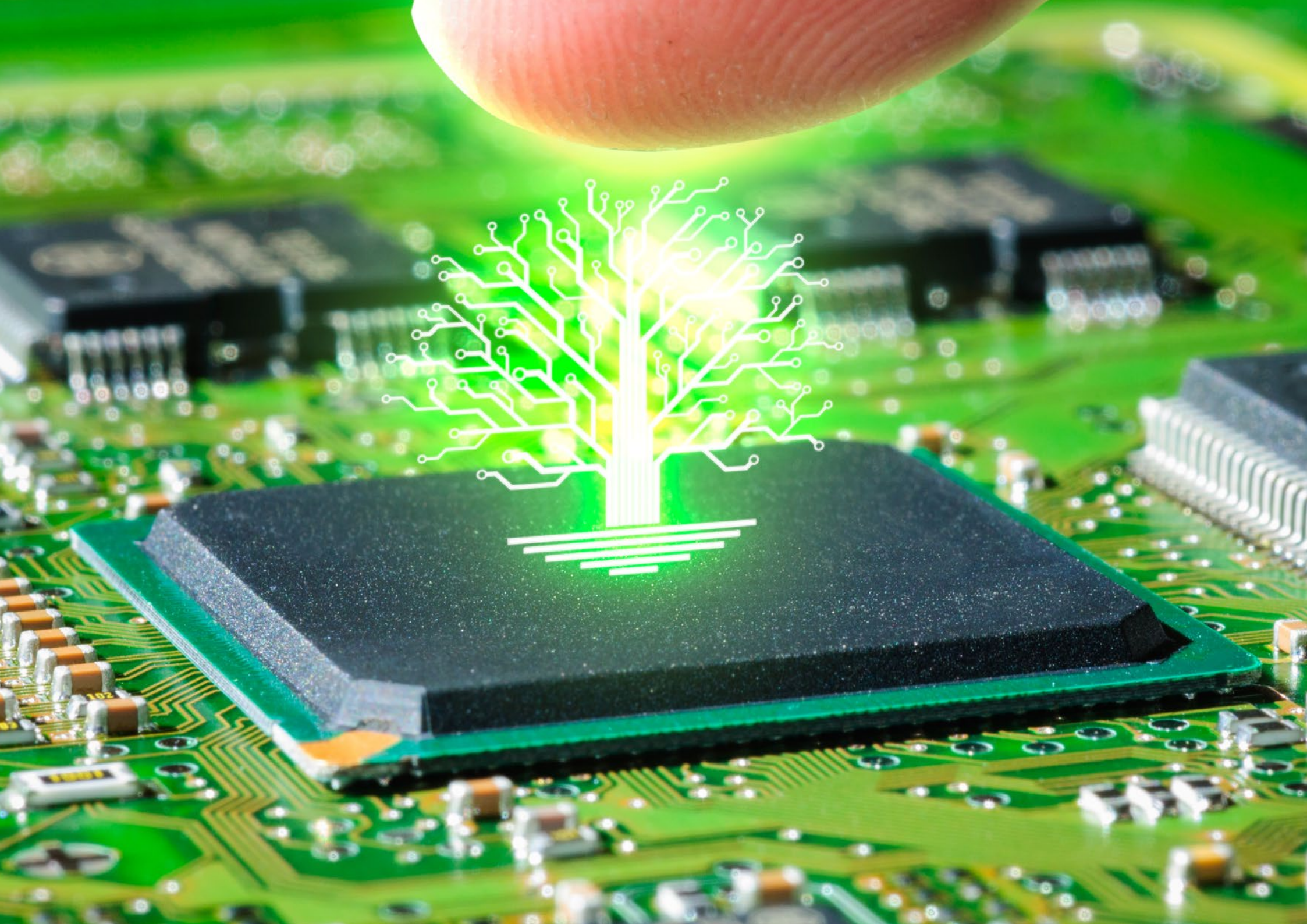
Some 46.7% of machinery and equipment manufacturers in the survey are considered to be digital beginners and 53.3% are digital explorers.

The survey found that digital investment in Taiwan’s machinery and equipment manufacturing industry is mainly concerned with improving internal operating performance, such as in R&D, quality and production efficiency. Operational excellence brings higher quality and better business performance, which is a key reason for investing in data analysis tools.

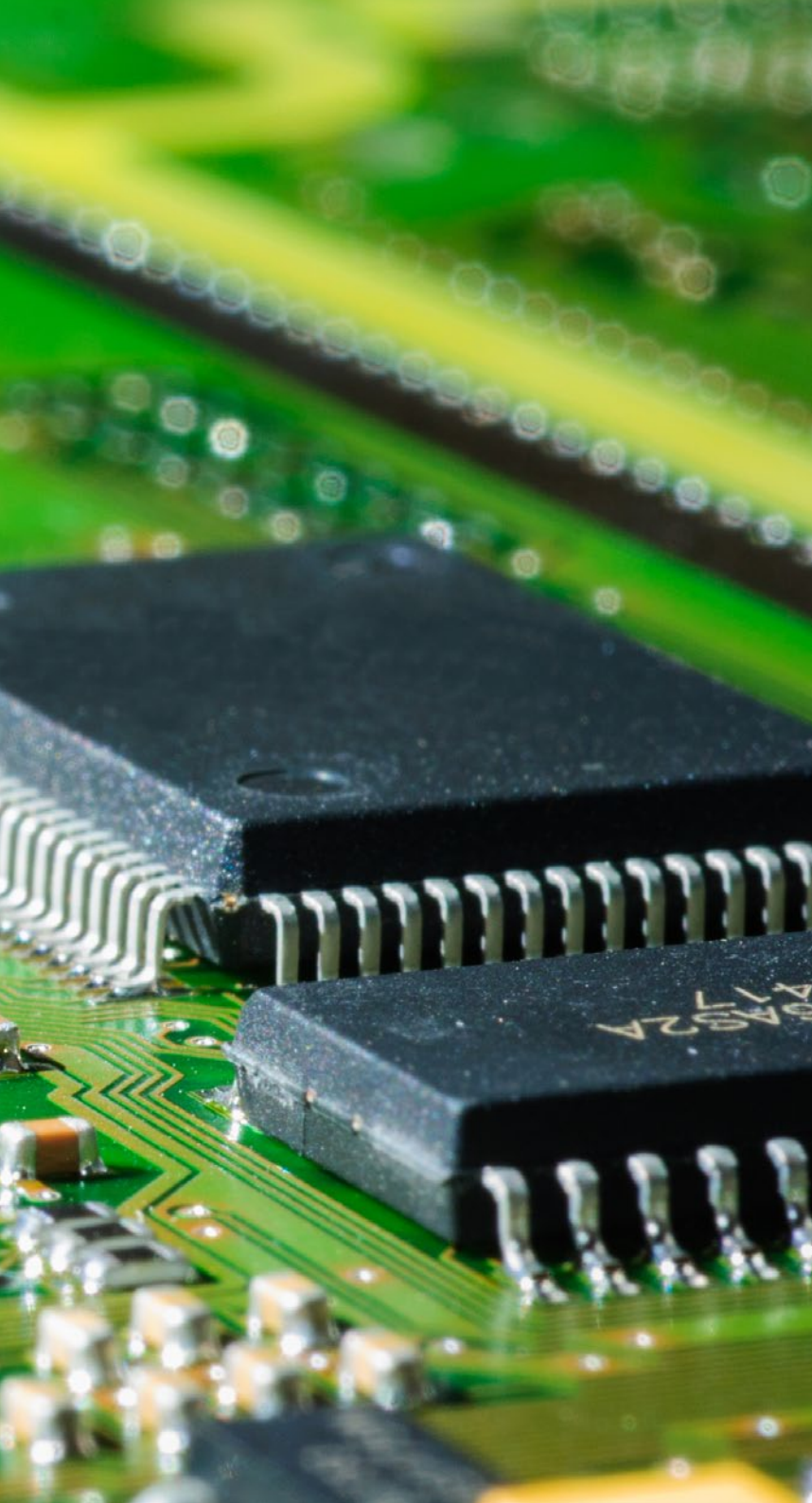
The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.











## 06

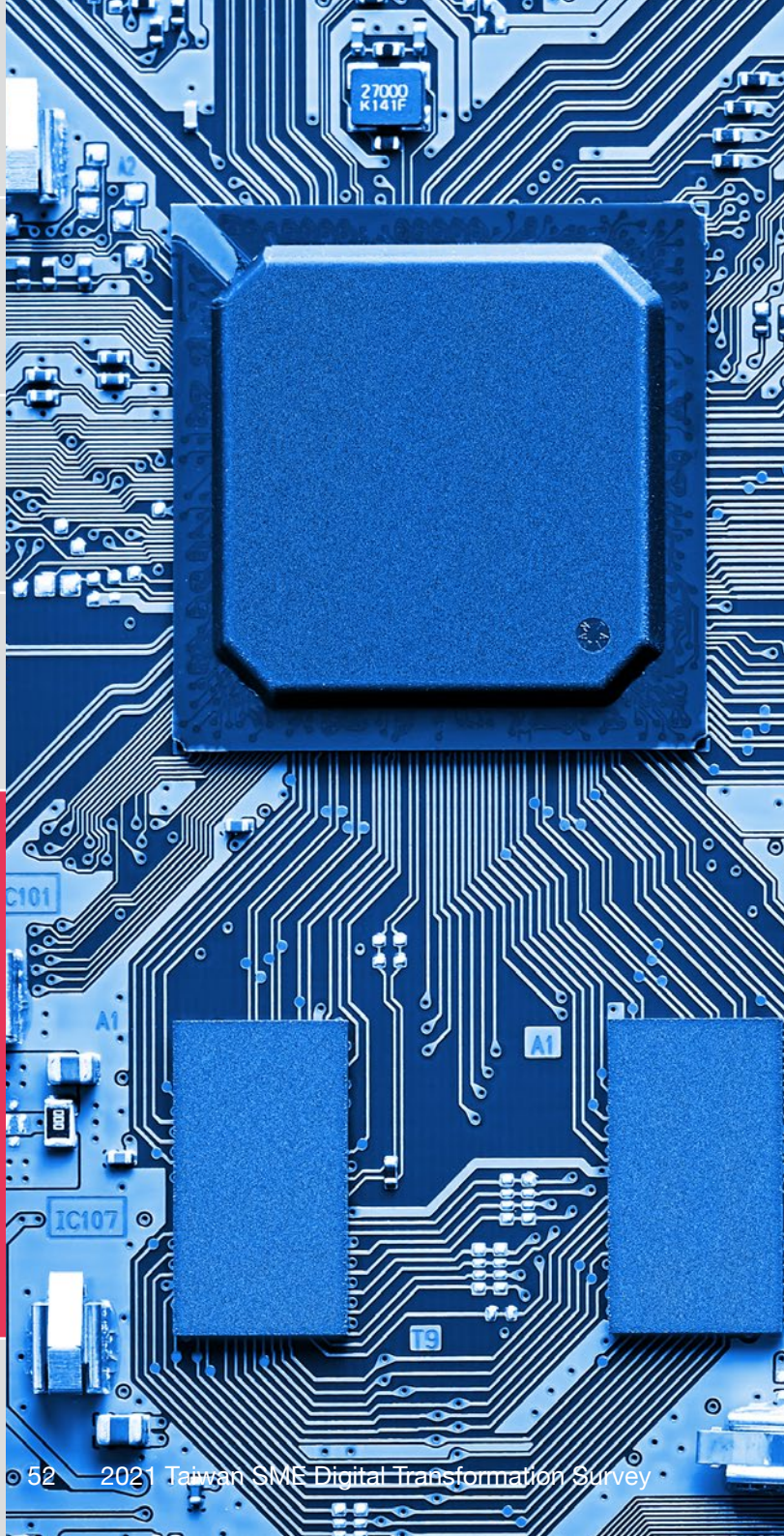
# Electronic components manufacturing industry

The COVID-19 pandemic boosted demand for consumer electronics products. The output value of Taiwan's electronic components industry recorded double-digit growth in the second quarter of 2020 and a quarterly record high of 11.1% in of the fourth quarter 2020, according to the 2021 Survey on Investment and Operation of Manufacturing Industry by the Ministry of Economic Affairs.

The industry's business model is largely predicated on support for electronic manufacturing service providers. Against a backdrop of growing trade barriers, environmental concerns, geopolitical tensions and rising transportation costs, manufacturers should look to establish an effective management model through digital transformation in response to global supply chain restructuring.

In addition, electronic components manufacturers should also pay close attention to future technology trends, seize the first-mover opportunity to enter niche markets, and plan ahead to gain a head start in the battle over new specifications and standards for electronic components.





## Using digital technology to overcome supply chain challenges

Taiwanese business leaders' concerns about supply chain disruptions rose from 15% in 2020 to 24% in 2021, according to PwC's 2021 Taiwan CEO Survey. Notwithstanding growing market demand for its products, the electronic components industry's supply chain has been impacted by the COVID19 pandemic and US-China trade tensions, leading to component shortages and supply delays, as well as shortages of labor and goods, which in turn have affected end-product output.

Supply chains are increasingly being restructured and shortened to bring production closer to the market and replace the centralized model of production. Electronic components manufacturers are also considering to decentralize their operations. No matter whether production is deployed in Southeast Asia, North America or Europe, supply chains will be greatly changed in the future.

# The large majority of electronic components manufacturers seek to improve operational efficiency through digital transformation, while strengthening adoption of new technologies is a key future goal

## Strengthening adoption of new digital technologies is a key objective of digital transformation for industry operators

The top three goals electronic components manufacturers wish to achieve through digital transformation are improving operational efficiency (68.8%), adopting new technologies (67.5%), and reducing operating costs (54.5%).

When further asked about their transformation goals for the next three years, the manufacturers prioritized the adoption of new technologies (57.1%), expanding market growth (54.5%), and the reduction of operating costs (50.6%).

The COVID-19 pandemic and global trade tensions helped to boost demand for electronic components by Taiwanese manufacturers, but also disrupted global supply chains. In the short term, transformation by electronic component manufacturers is focused on improving operational efficiency to maintain competitiveness in a fast-changing environment. In the long term, they will use transformation to strengthen adoption of new technologies and expand market growth.

Q: What does your company wish to achieve through digital transformation now and in the next three years? (You may select more than one answer)

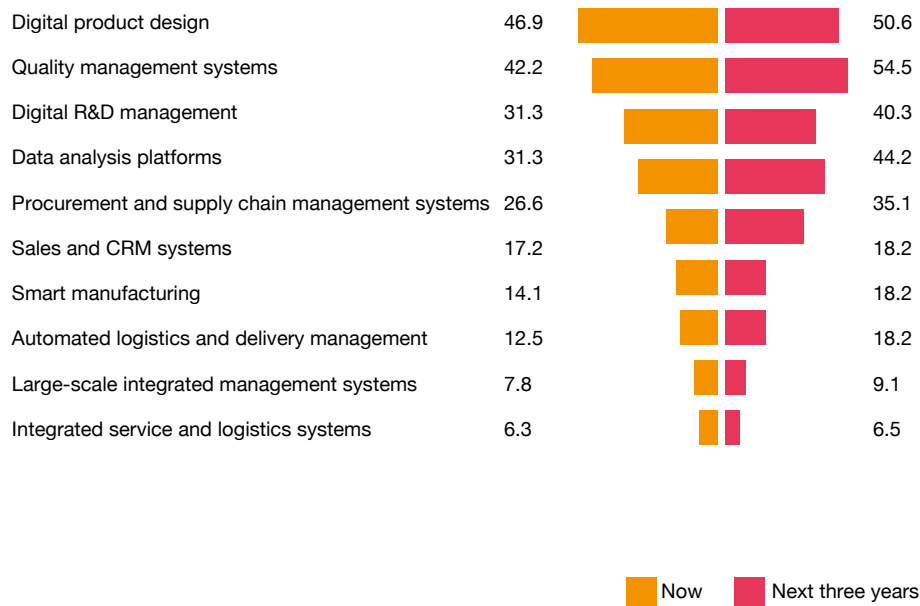


SME survey population: Now = 77; Next three years = 77



# About half of electronic components manufacturers currently use digital product design and expect to enhance quality through more digitalized design and digital R&D management in the future

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)

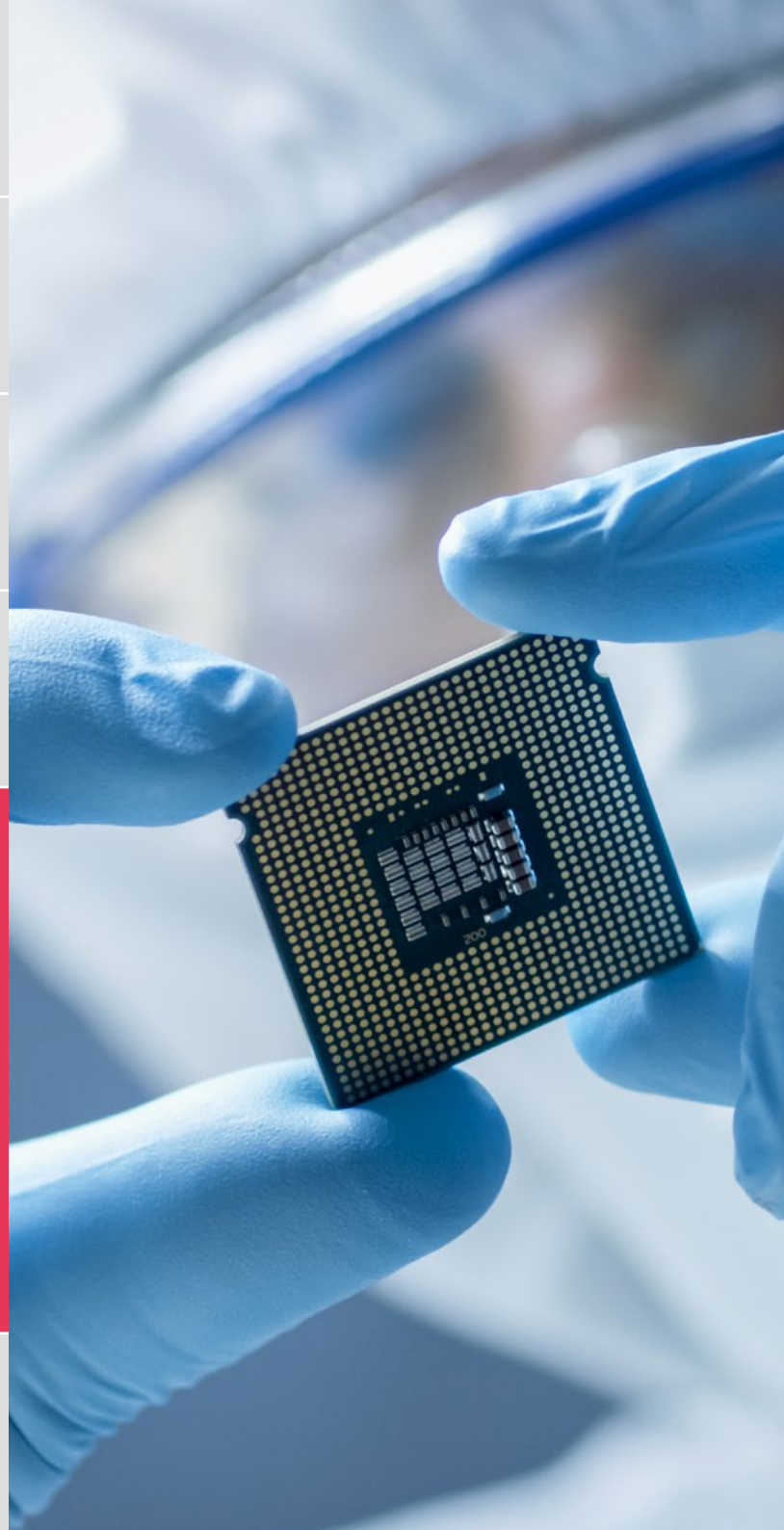


## Identifying potential problems and deficiencies through digital product design and simulations

The main digital tools currently used by electronic components manufacturers in their operations are digital product design (46.9%), quality management systems (42.2%) and digital R&D management (31.1%). For the next three years, they expect to primarily use quality management systems (54.5%), digital product design (50.6%), and data analysis platforms (44.2%).

As technology is ever changing, electronic components manufacturers expect to make more frequent use of digital product design tools and collaborate with downstream customers to respond faster to market demands. Other digital investments will focus on collection, analysis and improvement of quality data, new digital technologies for quality prediction, and the analysis and automatic detection of product abnormalities.

SME survey population: Now = 77; Next three years = 77



## Building digital connections and cultivating data-driven thinking

The major challenges electronic components manufacturers encountered in the transformation process were a lack of in-depth analysis of customer and market data (44.2%), lack of digital skills and talents (40.3%), and not knowing how to carry out transformation by stages (11.7%).

Most of the industry players are original equipment manufacturers since electronic parts and components are not directly related to the applications market, and so their control of the market is relatively weak. Therefore, the key for them is to conduct in-depth analysis of customer and market data through digital methods and data-driven approaches to expand into niche markets.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



44.2%

Lack of in-depth  
analysis of  
customer  
and market data



40.3%

Lack of digital  
skills and talents



11.7%

Not knowing how to  
carry out  
digital transformation  
by stages



10.4%

Not knowing the  
best transformation  
practices in the  
industry



7.8%

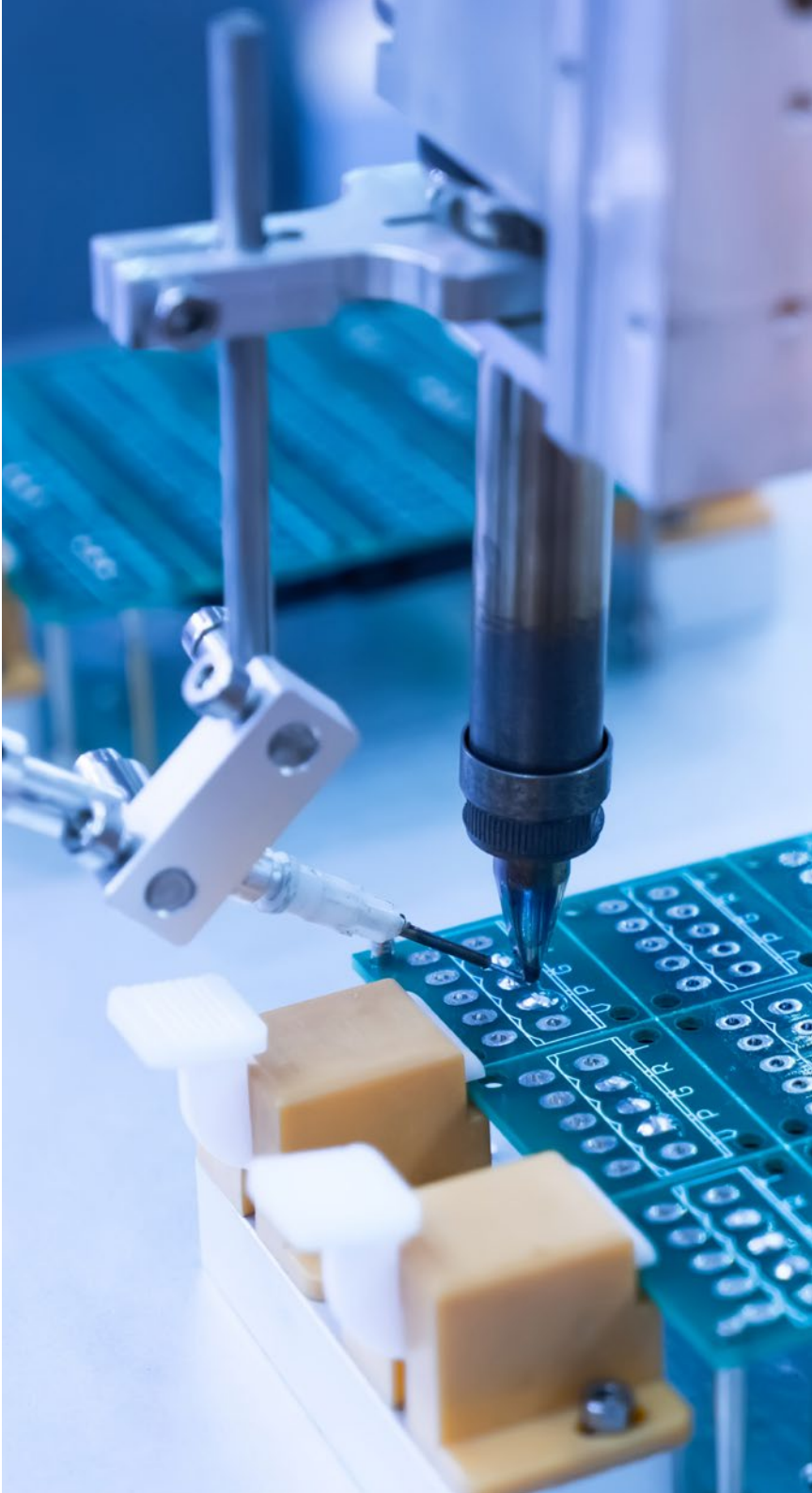
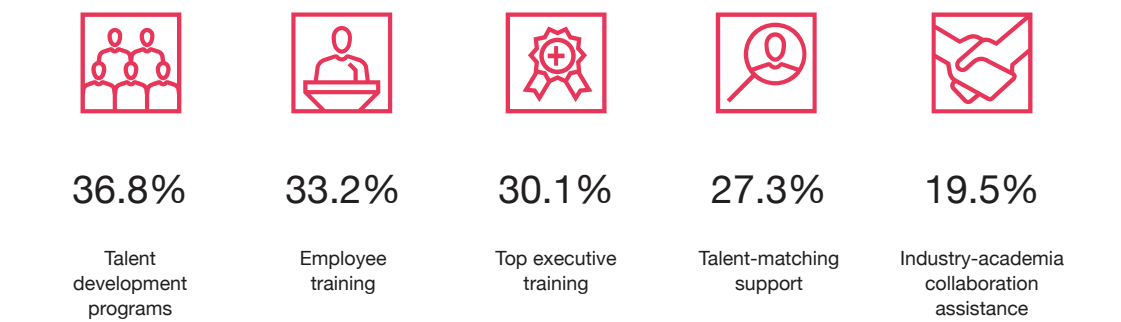
Resistance to  
change in the  
corporate culture

## Talent and management training is a key needed resource

Electronic components manufacturers say the key resources they need to achieve digitalization in the future include government programs for talent development (36.8%), employee training (33.2%), and training for their top executives (30.1%).

The electronic components manufacturing industry has good talent acquisition and qualifications compared to other industries. The digital resources needed include skills training, either through government programs or in-house. The industry puts more emphasis on the digital empowerment of employees during the transformation process.

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answers)

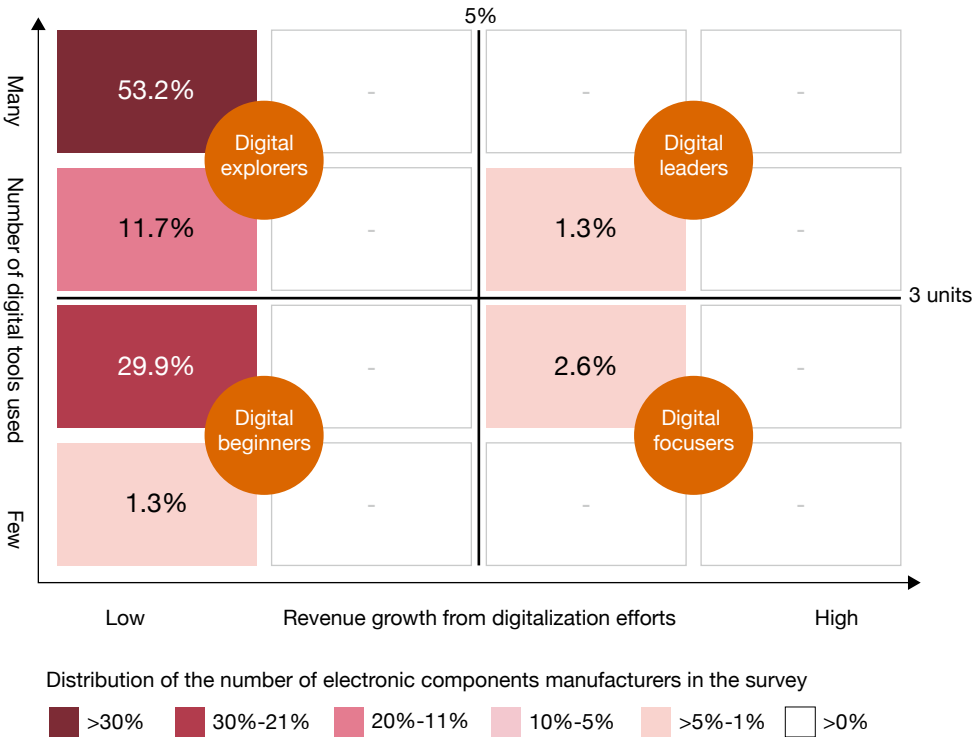


# Most of the electronic components manufacturers are digital explorers

The majority (64.9%) of electronic components manufacturers in the survey are considered to be digital explorers and 31.2% are digital beginners.

Compared with the other manufacturing industries in this survey, electronic components manufacturers are more receptive to using and trying out different types of digital tools. In addition to focusing on improving their internal operations through transformation, manufacturers should pay more attention to how they can convert their digital investments into revenue growth opportunities and increase their returns on digital transformation.

The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.











## 07

# Agriculture industry

Improving production efficiency is an important issue in Taiwan's agriculture industry given an aging population and a shrinking workforce. A 2021 report by the Agricultural Technology Research Institute, titled "Current Situation and Challenges of Digital Transformation in Taiwan's Agriculture Industry," found that over 60% of agricultural business owners believe digital transformation is a necessity and that digitalization will become an important trend in the domestic agriculture industry.

In recent years, the agriculture industry has been transforming towards precision and scientific agriculture, helped by advancements in technology and equipment, government support, and the return of next-generation new farmers to rural areas. Smart applications such as network monitoring and inspection have increased the scale, speed and output of the agricultural market.

An increasing number of next-generation farmers are returning to their parental homelands to introduce new business concepts and technological tools to help grow their family agricultural businesses. In view of that, the current owners need to consider the importance of good family communications to avoid inheritance disputes that may arise during the transformation process.





## Bridging digital communications and developing digital awareness

Taiwan had 775,000 farming households as of the end of 2019, with a farming and animal husbandry population of over 2.69 million, according to Council of Agriculture statistics. Taiwan's agricultural population is seriously aging, with the average age of farmers standing at 63 years.

As the government encourages young people to return to their rural homes, many who are taking over family agricultural businesses want to improve productivity and reduce costs through digital means, but they face challenges from their elders and a lack of digital awareness in the industry. To help resolve such issues, many owners have established digital command and communication roles, such as field team leaders who serve as a bridge between digitalization and older farmers.

## Most agribusiness owners want to use digital transformation to help lower operating costs and accelerate decision-making in the future

### Reducing operating costs is the main goal of transformation

Agribusiness owners say the goals they wish to achieve through digital transformation are to reduce operating costs (53.0%), improve operational efficiency (44.6%), and accelerate their decision-making process (43.4%).

When further asked about their transformation goals for the next three years, they named the acceleration of decision making (53.0%), reduction of operating costs (38.6%), and improvements in human resource management (38.6%).

Agricultural products are highly affected by climate change, making it difficult to standardize and duplicate them. In the short term, agribusiness owners mostly expect to control their production processes through digitalization and hope to eventually speed up their decision-making as part of preparations to deal with future environmental changes.

Q: What does your company wish to achieve through digital transformation now and in the next three years? (You may select more than one answer)

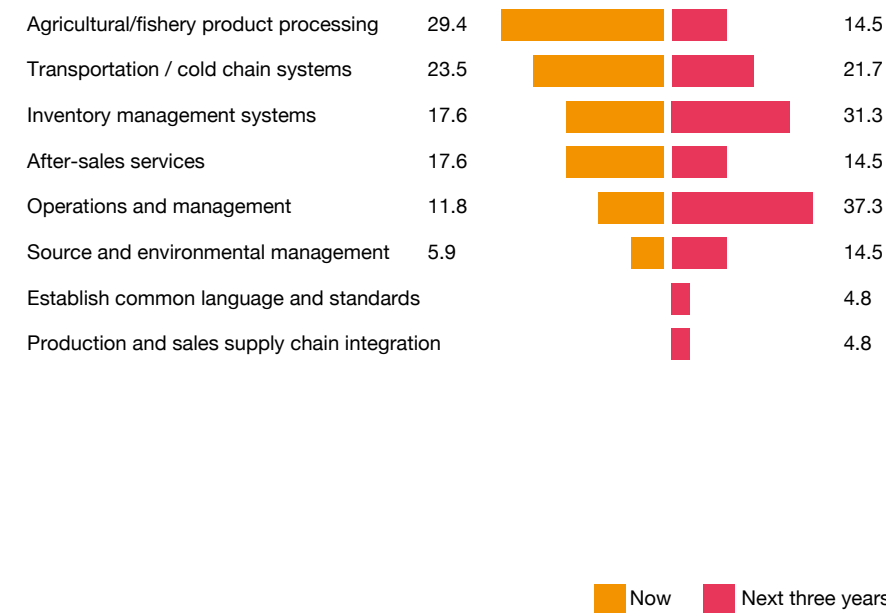


SME survey population: Now = 77; Next three years = 77



# The main digital applications currently used in agribusiness operations are for agricultural and fishery product processing, and those used in the future will primarily focus on assisting with operations and management

Q: What digital tools does your company use in its operations?  
(You may select more than one answer)



SME survey population: Now = 77; Next three years = 77

Digital tool focus will move from production and processing to product operations and sales

The main digital tools currently used by agribusinesses in their operations are agricultural/fishery product processing (29.4%), transportation/cold chain systems (23.5%), and inventory management systems (17.6%).

Looking ahead to the next three years, the main digital tools they expect to use include operations and management (37.3%), inventory management (31.3%) and transportation / cold chain systems (21.7%).

Many agricultural goods rely on primary processing methods. To upgrade their products and add more value, producers have turned In recent years to operational methods such as agribusinesses and cooperatives, developing brands and handling production, marketing, supply and delivery. As a result, digital tools used for inventory management, operations and management will become more important.

*Agricultural experience is generally passed down from generation to generation by word of mouth, and there is a lack of digital awareness and management in the industry.*

*The second-generation family operators of K.K. Orchard introduced digital tools to establish standard operating procedures and data reports in order to better understand agricultural production trends. This helped to create a common language for management and serve as a model for younger workers and digitalization transformation.*

*Digital transformation case:  
K.K. Orchard Co., Ltd.*

## Digital awareness and inter-gen communication issues

The major challenges that agricultural business enterprises say they encountered in the transformation process include a lack of digital awareness among users (39.8%), second-generation family succession issues (39.8%), and insufficient funding (27.7%).

Taiwan's agriculture industry is affected by an aging population and a shrinking workforce. The average age of farmers in front-line production is 63 years, according to government data. As agribusinesses rely on older workers who are unfamiliar with digital technology, it's important to develop digital awareness and digital talents when introducing and using new digital technology. Communicating, recording and passing on past work experience between generations regarding yield, quality, efficiency, costs, etc. is another an important issue.

Q: What are the major challenges that your company has encountered in the process of transformation? (You may select more than one answer)



39.8%

Lack of digital awareness among users



39.8%

Second-generation succession issues



27.7%

Insufficient funding



26.5%

Lack of digital skills and talents



21.7%

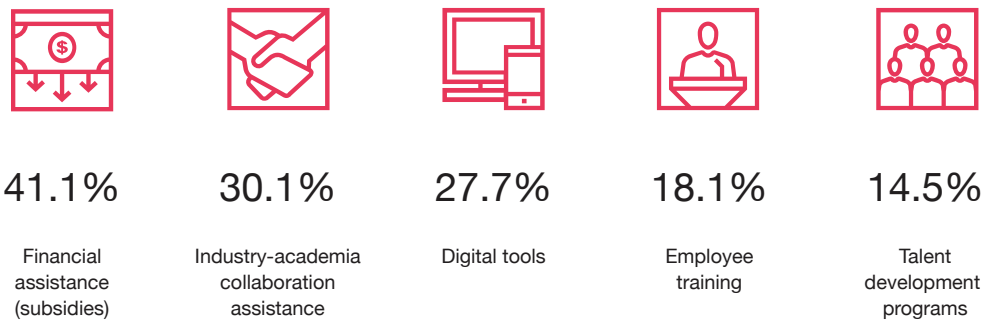
Lack of in-depth analysis of customer and market data

## Financial assistance, industry-academia collaboration assistance, and digital tools are the top three needed resources

The key resources agribusinesses say they need to achieve digitalization in the future are financial assistance (41.1%), industry-academia collaboration assistance (30.1%), and digital tools (27.7%).

As many agricultural business enterprises are in the initial stage of experimenting with digital tools, they need capital in order to invest and generate revenue. They hope to receive government subsidies to support the digital transformation process, and for industry-academia collaboration assistance and provision of suitable digital tools to bring qualitative changes to their enterprises.

Q: What resources will your company need to achieve digitalization in the future?  
(You may select more than one answers)

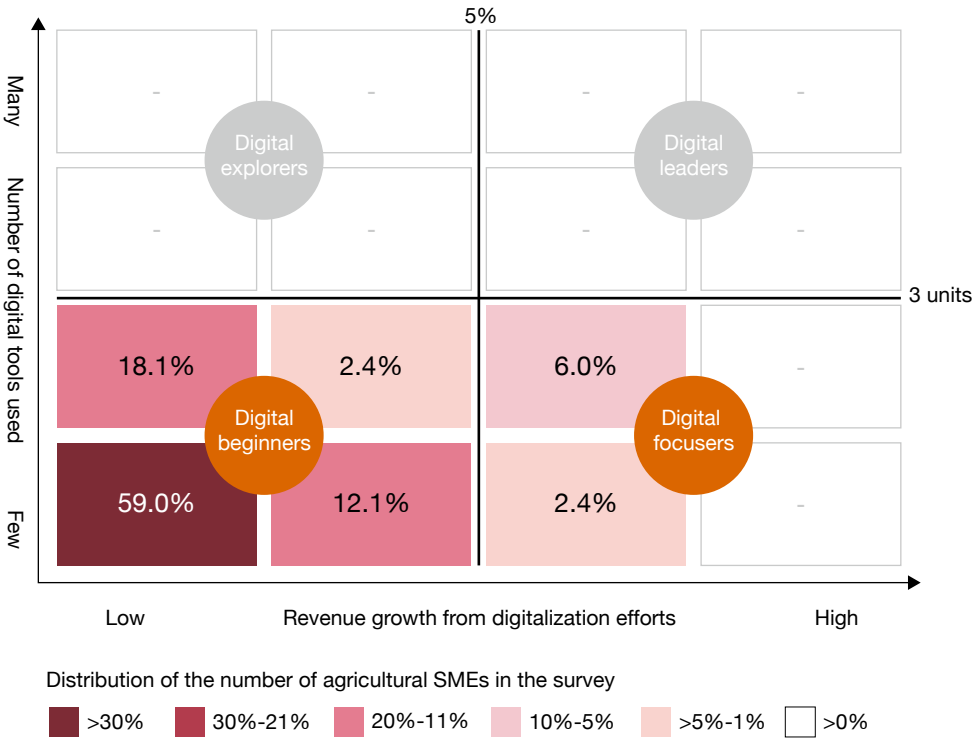


# Most agricultural business enterprises are digital beginners

The vast majority (91.6%) of agricultural business enterprises in the survey are classified as digital beginners and 8.4% digital focusers.

gribusinesses face the challenges of a lack of digital awareness and insufficient funding, and so they're unable to introduce or use a large number of digital tools all at once. The first step in the transformation of agricultural enterprises is to promote the importance of digital applications and educate employees in order to be able to accelerate digitalization.

The survey categorizes SMEs as digital beginners, digital explorers, digital focusers and digital leaders, based on the number of digital tools they use and the proportion of revenue growth generated from digitalization efforts.





# Conclusions and recommendations

The SME digital transformation survey was conducted in August-October 2021 during the COVID-19 pandemic. At that time, SMEs faced major challenges and sought to change their business models and strategies to survive, with many adopting digitalization/transformation to reduce operating expenses and drive business growth.

We hope this survey report on the current status of and needs for digital transformation among Taiwan's SMEs will serve as a useful reference for them on finding the right tools and direction. We thank the Small and Medium Enterprise Administration of the Ministry of Economic Affairs, industry associations in Taiwan, and participants in the Cloud Generation Project for their support in providing helpful insights into SMEs and their industries.

As well as analyzing their transformation, goals, use of digital tools, key challenges faced, resource needs and industry profiles, we also offer four recommendations based on our insights of digital transformation processes.

We also categorize SMEs as digital beginners, explorers, focusers and leaders based on the number of digital tools used and the revenue contribution from digitalization. We offer suggestions for each of these categories to help SMEs identify their current position and future direction.

## Go digital and show the value of innovation

SMEs should make use of digital empowerment in accordance with their business operations and business models to achieve greater value. For example, the manufacturing industry could introduce cloud computing, big data analysis and artificial intelligence to fully automate production and quality controls and so significantly improve the efficiency of their manufacturing operations.

## Strengthen data-driven decision-making

SMEs need to be more responsive to market demands by better understanding customers in a more timely manner. They also need to develop their capabilities for data-driven decision-making and to quickly identify key issues. For example, the wholesale and retail industry could collect data through digital tools to understand the key consumer decision points and accordingly make decisions about product design and advertising.

## Enhance customer experiences

SMEs should identify digital channels that customers prefer and provide them a warm experience through a designed digital interaction. For example, in this era of contact-free transactions, the F&B industry should upgrade its traditional way of doing business by using brand-specific applications and official communication applications to create an interactive digital experience for customers.

## Adopt a startup mentality

Innovating through digital transformation requires bold efforts and agile small-scale attempts to replicate successful transformation cases. SMEs could build and expand on this to establish their own ecosystems. For example, by making small-scale improvements to specialized apps that originally just provided membership services, they could establish their own service ecosystems through connecting information flows, cash flows and logistics.

#### Suggestions for digital beginners

##### **Learn from others' experiences to succeed**

Digital beginners should quickly select the digital tools they most need and choose small and easy-to-access areas in which to improve operational efficiency and reduce operating costs. For example, through TCloud, they could choose the best and fastest way to start straight away by using cloud solutions for e-commerce and customer services.

#### Suggestions for digital explorers

##### **Identify the root causes of performance issues and unleash the power of digital technologies**

Digital explorers need to learn why digitalization failed to reduce operating costs or bring revenue benefits and to identify the root causes. They should explore why their use of digital tools has not been successful, and then seek to optimize their tool usage by observing successful cases and consulting with external digital transformation experts.

#### Suggestions for digital focusers

##### **Replicate success cases to expand digital impact**

Digital focusers use specific digital tools that fit their business needs. The next step is to think about how to expand and replicate their digital success in other areas to drive continuous innovation. Through cooperation between internal digital talents, external transformation consultants and new start-up teams, digital focusers can identify the key to successful digital transformation and leverage the resources of industry-academia collaboration assistance programs to plan the next stages of their digital transformation.

#### Suggestions for digital leaders













##### **Deepen innovation and build an open culture**

Digital leaders should establish a corporate culture of innovation and internalize digital transformation as an integral part of the organization. For example, SMEs could establish a digital innovation office to systematically and continuously promote digital innovation, train and promote outstanding talents with internal and external support, provide products or services, maintain customer relationships, and achieve sustainable corporate development.






# Transformation resources for Taiwan SMEs

Making good use of various resources is key to successful transformations

| Transformation challenges   | Integrated resource plans (Chinese only)   |  |  |
|---|--|--|--|
| <p>Digital talent acquisition</p>          | <p>Digital Youth T Ambassadors</p> <p>Industry-academia cooperation programs</p> <p>Digital skills training courses</p>  | <p>Digital talent development through public-private partnerships</p> <p>For more information, visit <a href="https://3t.org.tw/">https://3t.org.tw/</a></p>                           |                   |
| <p>Engaging in digital transformation</p>  | <p>Transformation consultants / experts</p> <p>SME Digital Guide</p> <p>Industry associations / accelerators</p> <p>Business consulting / strategic consulting</p> | <p>Professional consultants to help with transformation</p> <p>For more information, visit <a href="https://www.tcloud.gov.tw/consultant">https://www.tcloud.gov.tw/consultant</a></p> |                   |
| <p>Seeking digital tools</p>             | <p>TCloud</p> <p>Solutions by information service providers</p> <p>Innovative tools for startups</p>   | <p>Digital tool selection, subsidies for cloud applications</p> <p>For more information, visit <a href="https://www.tcloud.gov.tw">https://www.tcloud.gov.tw</a></p>                   |                  |
| <p>Learning from role models</p>         | <p>Transformation case center</p> <p>Summits / exhibitions</p> <p>Business magazines / association publications</p> <p>Seminars / industry meetups / workshops</p> | <p>Learn from transformation cases and models</p> <p>For more information, visit <a href="https://www.digital-trans-survey.com/">https://www.digital-trans-survey.com/</a></p>         |                 |
|  Digital beginner                        |  Digital explorer   |  Digital Focuser  |  Digital Leader |

# Transformation resources for Taiwan SMEs

## Cloud generation industry resources provide comprehensive support

| Industry  | Cloud generation industry resources (Chinese only)  |   |   |
|---|---|---|---|
| Small and medium service providers  | Importing cloud services<br>Enhancing data feedback<br>Driving business model innovation  | Enhance digital operations and new business models via transformation<br>For more information, visit<br><a href="https://www.smebiz.org.tw/">https://www.smebiz.org.tw/</a>   |    |
| Small and medium manufacturers  | Encouraging conventional industries to engage in independent research and development<br>Accelerating production transformation<br>Enhancing competitiveness    | Digitalization of manufacturing industry to enhance solutions<br>For more information, visit<br><a href="https://www.citd.moeaidb.gov.tw/cloud/web/atotal.aspx">https://www.citd.moeaidb.gov.tw/cloud/web/atotal.aspx</a> |    |
| Agriculture and fishery production / marketing and agricultural machinery | Moving toward a digital transformation generation<br>Transformation-oriented, digital-supported business model<br>Creating new digital transformation platforms | Agriculture/fishery production and marketing through digital management<br>For more information, visit<br><a href="https://agdigi.atrri.org.tw/">https://agdigi.atrri.org.tw/</a>   |  |





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