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Adoption of digital technologies, business model innovation, and financial and sustainability performance in start-up firms

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APPENDIXES

Adoption of Digital Technologies, Business Model Innovation, and Financial and Sustainability Performance in Start-Up Firms

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Appendix 1 Factor Loadings for Variables

| | Factor | Survey Item | Factor Loading | Uniqueness |
|--|--|---|----------------|------------|
| Reliance on Digital Applications | Mobile and Web Applications | Our own mobile applications | 0.89 | 0.20 |
| | | Our own applications in the Internet | 0.85 | 0.23 |
| | IOT, IIOT, Robotics, Blockchain | Internet of Things (IoT), Industrial Int... | 0.80 | 0.34 |
| | | Robotics, intelligent machinery | 0.84 | 0.28 |
| | | Blockchain, distributed ledgers | 0.70 | 0.47 |
| Application of Digital Technologies in Business Model | Internal Activities | Our human resource processes are fully d... | 0.74 | 0.46 |
| | | Our customer management system and custo... | 0.81 | 0.34 |
| | | Our accounting system is fully digitaliz... | 0.78 | 0.40 |
| | | We use digital technologies and data to ... | 0.71 | 0.50 |
| | | We use digital technologies for resource... | 0.74 | 0.45 |
| | | We are a fully data-driven company | 0.71 | 0.50 |
| | Marketing, Sales, Customer Interactions | We advertise our products and services p... | 0.77 | 0.41 |
| | | We constantly use social media to intera... | 0.81 | 0.34 |
| | | We constantly monitor how our customers ... | 0.83 | 0.31 |
| | | Our customers can order or pay online (o... | 0.76 | 0.43 |
| | | We actively monitor our online ratings a... | 0.85 | 0.28 |
| | | We operate our own online user community | 0.70 | 0.51 |
| | Products and Services | Our products and services are fully digi... | 0.81 | 0.35 |
| | | Our products and services are connected ... | 0.80 | 0.37 |
| | | We use digital platforms to test new pro... | 0.83 | 0.31 |
| | Partnerships | We actively work with partners to increa... | 0.94 | 0.12 |
| | | We collaborate with partners to create n... | 0.94 | 0.12 |
| Business Model Experimentation | Business Model Experimentation | Our target customers and customer segmen... | 0.67 | 0.55 |
| | | Our sales and marketing operations | 0.72 | 0.48 |
| | | How we interact with our customers | 0.63 | 0.60 |

| | Factor | Survey Item | Factor Loading | Uniqueness |
|-----------------------------------|--|---|----------------|------------|
| | | How we make and deliver our products and... | 0.71 | 0.49 |
| | | Our partnerships (i.e., who we work with... | 0.69 | 0.53 |
| | | Our suppliers | 0.62 | 0.61 |
| | | Our products and services | 0.73 | 0.47 |
| | | What activities we do ourselves and what... | 0.76 | 0.43 |
| | | How we generate revenue (e.g., how we ch... | 0.77 | 0.41 |
| | | What business opportunities we address | 0.75 | 0.44 |
| | | Our entire business model – i.e., how ou... | 0.80 | 0.37 |
| Sustainability Performance | Environment Sustainability Performance (internal) | We go well beyond the minimum required b... | 0.82 | 0.27 |
| | | We take great effort to use renewable an... | 0.82 | 0.20 |
| | | We recycle all our waste | 0.80 | 0.28 |
| | Environment Sustainability Performance (external) | We have applied for or been awarded a gr... | 0.75 | 0.41 |
| | | We monitor our suppliers closely to ensu... | 0.74 | 0.29 |
| | | We often donate to environmental causes | 0.77 | 0.37 |
| | | We have a clearly defined mission to hel... | 0.75 | 0.26 |
| | | We are widely recognized as an environme... | 0.84 | 0.19 |
| | | We have a system in place to ensure we k... | 0.80 | 0.21 |
| | Social Sustainability Performance | We go well beyond the minimum required b... | 0.76 | 0.42 |
| | | We take great effort to make a positive ... | 0.85 | 0.28 |
| | | We have a clearly defined social mission... | 0.86 | 0.26 |
| | | We often donate to those in need | 0.67 | 0.55 |
| | | It is very important for us to be a good... | 0.71 | 0.50 |
| | | We have a system in place to ensure we k... | 0.85 | 0.28 |
| | Stakeholder Sustainability Performance | We take extra effort to treat our employ... | 0.79 | 0.38 |
| | | It is very important for us to treat our... | 0.81 | 0.35 |

| | Factor | Survey Item | Factor Loading | Uniqueness |
|-----------------------------|---|---|----------------|------------|
| | | We pay close attention to workplace safe... | 0.78 | 0.40 |
| | | It is important for us to treat all our ... | 0.80 | 0.36 |
| Business Performance | Financial Performance (against own expectations) | Sales growth | 0.92 | 0.11 |
| | | Profitability | 0.91 | 0.13 |
| | | Number of paying customers | 0.85 | 0.20 |
| | Operational Performance (against own expectations) | Development of new products and services | 0.79 | 0.32 |
| | | Efficiency of our operations | 0.84 | 0.25 |
| | | Our ability to cope with the covid-19 cr... | 0.72 | 0.34 |
| | Performance (compared against peers) | Sales growth | 0.88 | 0.23 |
| | | Profitability | 0.85 | 0.28 |
| | | Number of paying customers | 0.86 | 0.26 |
| | | Development of new products and services | 0.77 | 0.40 |
| | | Efficiency of our operations | 0.80 | 0.37 |
| | | Our ability to cope with the covid-19 cr... | 0.81 | 0.35 |
| Controls | Firm Age | 2021 - (year business started) +1 | | |
| | Firm Size (FTE) | Total number of employees (FTE) | | |
| | Country Dummies | True=1 | | |

Appendix 2 Survey Questionnaire

Digitalization, Start-ups and Sustainability

We are studying how start-up businesses leverage digital technologies to innovate their business models and speed up their growth. With this survey we are collecting feedback from start-ups in Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

The study is a collaboration between Asian Development Bank, leading business schools in ASEAN (Asia School of Business, De La Salle University, Padjadjaran University Indonesia, Sasin School of Management, Singapore Management University, Thu Dau Mot University) and Imperial College Business School, United Kingdom. The contact person for this study in [CITY/COUNTRY] is xx.xx@xx.xx.xx. And cell phone number +nn– nn nnn nn nn

This survey is confidential. Identifiable data concerning individual businesses will not be published. The data will be stored in a secure server, and only the research team will be able to access it for research purposes only.

We will publish a report of our findings, including implications for policy and entrepreneurial practice. If you wish to receive a copy of the report, please tick the box below.

We will also organize a webinar to elaborate the implications of our findings for entrepreneurs and how entrepreneurs can best harness digital technologies to boost their business. If you wish to attend such a webinar, please tick the box below.

☐ Yes, I want a copy of the report

☐ Yes, I want to attend a webinar discussing implications for entrepreneurs

[Use the space below to provide instructions for interviewers]

Part 1 Background

| | |
|---|--|
| 1.1 Information about the business | |
| (NOTE: This needs to be recorded before the interview and only checked during the interview for correctness) | |
| Company name | |
| Respondent name | |
| Respondent position (also indicate if respondent is co-founder) | |
| Respondent's ownership share of the company | Respondent owns _____ % of the business (0 – 100%) |
| [PREFILLED] Respondent's LinkedIn profile URL (if any) | |
| 1.2 Please describe in your own words what your business does – its products and services and its main customers | |
| | |
| 1.3 How many people currently work for this business? | |
| NOTE: If the company has part-time employees, ask the respondent to indicate full-time equivalents | Number of employees |
| The number of employees in total | |
| The number of employees primarily working in product development | |
| The number of employees primarily working in sales and marketing | |
| The number of employees primarily working in production and operations | |
| 1.4 What year did your company start doing business? | |
| 1.5 Please estimate the number of customers to which your company has sold products and services during the previous 12 months | (Indicate number) |
| 1.5.1 How many of these are business customers (i.e., companies and similar)? | (Indicate number) |
| 1.5.2 Please estimate what percentage of your sales revenue comes from sales of <u>products</u> rather than services! | (Indicate %) |

| | |
|--|--|
| 1.6 Please estimate the number of SUPPLIERS your company has done business with during the previous 12 months | (Indicate number) |
| 1.7 We would like to know more about you. What is your highest level of education (modify by country)? | Tick (X) the option that applies best |
| Primary or secondary school [COUNTRY SPECIFIC] | |
| Vocational or college degree [COUNTRY SPECIFIC] | |
| Bachelor's degree [COUNTRY SPECIFIC] | |
| Master's degree [COUNTRY SPECIFIC] | |
| Doctoral degree (PhD) [COUNTRY SPECIFIC] | |
| 1.8 Have you ever studied outside [country] for longer than four months? | (Indicate 'yes' or 'no') |
| 1.9 Are you currently a citizen of [country] (that is, do you own or could own a passport of [country])? | (Indicate 'yes' or 'no') |
| 1.10 Were you born in [country]? | (Indicate 'yes' or 'no') |
| 1.11 How many years of work experience did you have prior to starting this business? | (Indicate number of years) |
| 1.12 How many years of this work experience were gained outside [country]? | (Indicate number of years) |
| 1.13 How many businesses have you or your team started before this one, if any? | (Indicate number) |
| 1.14 How many businesses have you or your team started before this one, if any? | (Indicate number) |
| 1.15 How many people actively participate in managing this business as members of your entrepreneurial team? | (Indicate number) |
| 1.16 How regularly do you exchange ideas and experiences with others in your entrepreneurial community? | 1 = never, 2 = a few times per year, 3 = monthly, 4 = weekly, 5 = daily |
| Other start-ups and digital entrepreneurs | 1 2 3 4 5 |
| New business incubators, new venture accelerators, co-working spaces | 1 2 3 4 5 |

Part 2 Business

| | |
|---|--|
| 2.1 Which of the following best describes your company's current revenue status? | Tick (X) the option that applies BEST (1 only) |
| Pre-revenue: We are not yet generating regular sales revenue | |
| Pre-profit: We have sales revenue but not yet sufficient to cover our costs | |
| Profit: We have regular sales revenue and are making a profit | |
| Has the covid crisis affected your company's performance? (1 = very negative impact, 3 = no effect, 5 = very positive impact) | 1 2 3 4 5 |
| 2.2 Your business model describes what products and services you offer, how you interact with your customers, who you work with to create and deliver your products and services, what your key resources and activities are, and how you make money. Which of the following best describes your business model at the moment? | Tick (X) the option that applies best |
| We only just started to experiment with different product ideas | |
| We have a pretty good product or service idea but are still experimenting with other aspects of our business model | |
| Our business model is set, and we are operating in a steady state | |
| Our business model is set, and we are seeking to grow our business rapidly | |
| 2.3 How is your business funded? Please rate the importance of the following funding sources for your business. (Select '1' if the funding form is not used) | 1 = not at all important 5 = very important |
| Founders' family and personal savings | 1 2 3 4 5 |
| Loans from financial institutions such as banks | 1 2 3 4 5 |
| Government grants | 1 2 3 4 5 |
| External investors | 1 2 3 4 5 |
| 2.4 In the past 12 months, have you sold products or services to customers who are located outside your home country? If yes, what year did you first receive sales revenue from abroad? | (Indicate either 'NO' or year of first foreign sales) |
| 2.5 (ASK ONLY IF THEY HAVE INTERNATIONAL SALES) What percentage of your total sales revenue did you generate outside your home country during the past 12 months? (Mark '0' if no sales outside country!) | (Indicate %) |

Part 3 Business Model and Digitalization

Remember, your business model describes how your company does business and organizes its business operations with suppliers, customers, and partners!

| 3.1 To what extent does your business rely on the following digital technologies? | Not relevant | Not at all | All the time | | |
|---|--------------|------------|--------------|---|-----|
| | | << | | | >> |
| Company homepage and website | 0 | 1 | 2 | 3 | 4 5 |
| Mobile phones and smartphones | 0 | 1 | 2 | 3 | 4 5 |
| Fixed line Internet (cable, optical cable, copper line) | 0 | 1 | 2 | 3 | 4 5 |
| Our own mobile applications | 0 | 1 | 2 | 3 | 4 5 |
| Our own applications in the Internet | 0 | 1 | 2 | 3 | 4 5 |
| Machine learning, AI technologies (artificial intelligence) | 0 | 1 | 2 | 3 | 4 5 |
| Cloud computing and cloud services | 0 | 1 | 2 | 3 | 4 5 |
| Internet of Things (IoT), Industrial Internet of Things (IIoT) | 0 | 1 | 2 | 3 | 4 5 |
| Robotics, intelligent machinery | 0 | 1 | 2 | 3 | 4 5 |
| Blockchain, distributed ledgers | 0 | 1 | 2 | 3 | 4 5 |
| Augmented Reality, Virtual Reality (AR, VR) | 0 | 1 | 2 | 3 | 4 5 |
| Internet resources such as bit.ly, Trello, Slack, FB business suite, Creator studio, Discord, Xero, Google Analytics... | 0 | 1 | 2 | 3 | 4 5 |
| [INTERVIEWER ASSESSMENT] How knowledgeable was the respondent and how reliable were their answers in your opinion? 1 = not at all reliable; 5 = extremely knowledgeable and reliable | | 1 | 2 | 3 | 4 5 |
| 3.2 We are interested in how you use digital technologies in your business. How well do the following statements describe your operations? | | | | | |
| 3.2.1 Internal Activities | | Not at all | Perfectly | | |
| | | << | | | >> |
| Our human resource processes are fully digitalized (e.g., salary payments, recruitment, training...) | | 1 | 2 | 3 | 4 5 |
| Our customer management system and customer databases are fully digitalized | | 1 | 2 | 3 | 4 5 |
| Our accounting system is fully digitalized | | 1 | 2 | 3 | 4 5 |
| We use suppliers to manufacture products under our own brand | | 1 | 2 | 3 | 4 5 |
| We use digital technologies and data to optimize our manufacturing, service, and logistics | | 1 | 2 | 3 | 4 5 |
| We use digital technologies for resource and inventory planning | | 1 | 2 | 3 | 4 5 |
| Our staff often work from home with a digital connection | | 1 | 2 | 3 | 4 5 |

| | | | | | |
|---|---|---|---|---|---|
| Our sales and marketing operations | 1 | 2 | 3 | 4 | 5 |
| How we interact with our customers | 1 | 2 | 3 | 4 | 5 |
| How we make and deliver our products and services | 1 | 2 | 3 | 4 | 5 |
| Our partnerships (i.e., who we work with – other than suppliers) | 1 | 2 | 3 | 4 | 5 |
| Our suppliers | 1 | 2 | 3 | 4 | 5 |
| Our products and services | 1 | 2 | 3 | 4 | 5 |
| What activities we do ourselves and what activities our partners do | 1 | 2 | 3 | 4 | 5 |
| How we generate revenue (e.g., how we charge for our products) | 1 | 2 | 3 | 4 | 5 |
| What business opportunities we address | 1 | 2 | 3 | 4 | 5 |
| Our entire business model – i.e., how our company does business and organizes its operations | 1 | 2 | 3 | 4 | 5 |
| [INTERVIEWER ASSESSMENT] How knowledgeable was the respondent and how reliable were their answers to 3.3 in your opinion? 1 = not at all reliable; 5 = extremely knowledgeable and reliable | 1 | 2 | 3 | 4 | 5 |
| 3.4 To what extent can the changes in your Business Model, as mentioned above, be regarded as innovative? | 1 = disagree 2 = somewhat disagree 3 = neither agree nor disagree 4 = somewhat agree 5 = agree | | | | |
| Many of the changes in our business model are already widely practiced by our competitors | 1 | 2 | 3 | 4 | 5 |
| Many of the changes our business model so new that no other company in our country has done similar things before | 1 | 2 | 3 | 4 | 5 |
| Many of the changes our business model so new that no other company has anything like it anywhere in the world | 1 | 2 | 3 | 4 | 5 |
| [INTERVIEWER ASSESSMENT] How knowledgeable was the respondent and how reliable were their answers to 3.4 in your opinion? 1 = not at all reliable; 5 = extremely knowledgeable and reliable | 1 | 2 | 3 | 4 | 5 |

| How we treat our employees, suppliers, and business partners | | Not at all Perfectly << >> | | | | |
|---|---|--|---|---|--|---|
| We go well beyond the minimum required by legal authorities in treating our employees, partners, and suppliers | | 1 | 2 | 3 | 4 | 5 |
| We take extra effort to treat our employees well, like family | | 1 | 2 | 3 | 4 | 5 |
| It is very important for us to treat our suppliers and partners fairly and not take unfair advantage over them | | 1 | 2 | 3 | 4 | 5 |
| We pay close attention to workplace safety | | 1 | 2 | 3 | 4 | 5 |
| It is important for us to treat all our employees equally regardless of gender, age, ethnicity, or religion | | 1 | 2 | 3 | 4 | 5 |
| As a business, we are widely recognized as a great employer who treats their employees well | | 1 | 2 | 3 | 4 | 5 |
| [INTERVIEWER ASSESSMENT] How knowledgeable was the respondent and how reliable were their answers in section 4.1 in your opinion? 1 = not at all reliable; 5 = extremely knowledgeable and reliable | | 1 | 2 | 3 | 4 | 5 |
| 4.2 We are interested in how your business emphasizes alternative goals. Please indicate below how you prioritize the following pairs of goals. (For example, in the first question below, 'a' would mean that you give complete priority for financial profit and zero priority to environmental sustainability; 'c' would mean that you give equal weight to both; and 'e' would mean that you always prioritize sustainability over profit). | | | | | | |
| Financial profit regardless of our impact on the environment | a | b e | c | d | Environmental sustainability even if this would mean we make no profit at all | |
| Financial profit regardless of our impact on our local community | a | b e | c | d | Social mission even if this would mean we make no profit at all | |
| Financial profit regardless of the needs of our suppliers and employees | a | b e | c | d | The welfare of our employees and suppliers even if we would have to sacrifice profit | |

Part 5 Performance

| | | | | | |
|--|-------------------------|---|---|---|--------------------------|
| 5.1 Comparing against your goals and expectations you had for the company one year ago, how well has your company performed during the past 12 months? | Much worse << | | | | Much better >> |
| Sales growth | 1 | 2 | 3 | 4 | 5 |
| Profitability | 1 | 2 | 3 | 4 | 5 |
| Number of paying customers | 1 | 2 | 3 | 4 | 5 |
| Development of new products and services | 1 | 2 | 3 | 4 | 5 |
| Efficiency of our operations | 1 | 2 | 3 | 4 | 5 |
| Our ability to cope with the covid-19 crisis | 1 | 2 | 3 | 4 | 5 |
| 5.2 How does your company's performance compare against your <u>typical</u> competitor over the past 12 months? (If you do not have any local competitors, please think about a foreign equivalent) | Much worse << | | | | Much better >> |
| Interviewer note: Mark 'X' if company did not have local competitors in the country | | | | | |
| Sales growth | 1 | 2 | 3 | 4 | 5 |
| Profitability | 1 | 2 | 3 | 4 | 5 |
| Number of paying customers | 1 | 2 | 3 | 4 | 5 |
| Development of new products and services | 1 | 2 | 3 | 4 | 5 |
| Efficiency of our operations | 1 | 2 | 3 | 4 | 5 |
| Our ability to cope with the covid-19 crisis | 1 | 2 | 3 | 4 | 5 |
| 5.3 Thinking about your company's environmental and social sustainability, how does your company compare against a <u>typical close competitor</u>? (If you do not have any local competitors, please think about a foreign equivalent) | Much worse << | | | | Much better >> |
| Interviewer note: Mark 'X' if company did not have local competitors in the country | | | | | |
| Environmental sustainability | 1 | 2 | 3 | 4 | 5 |
| Social sustainability | 1 | 2 | 3 | 4 | 5 |
| The welfare of our employees and suppliers | 1 | 2 | 3 | 4 | 5 |
| 5.4 How many new products, services, and business model ideas you have introduced during the past 12 months? (Indicate number in the box) | | | | | |
| Number of <u>changes</u> to <u>existing</u> products and services | | | | | |

| | |
|--|-----------------------|
| Number of <u>completely new products and services</u> that we did not sell before | |
| Number of <u>smaller adjustments</u> in our business model (i.e., in how we do business – other than products and services) | |
| Number of <u>major changes</u> in our business model (i.e., how we do business – other than products and services) | |
| [INTERVIEWER ASSESSMENT] How knowledgeable was the respondent and how reliable were their answers to 5.1 – 5.4 in your opinion? 1 = not at all reliable; 5 = extremely knowledgeable and reliable | 1 2 3 4 5 |
| 5.5 What percentage of your sales came from products and services that were introduced during the past 12 months? | |
| | % |
| 5.6 Finally, how good was your financial performance during the latest full accounting year? | |
| Sales turnover [indicate currency!] | |
| Profit margin as % of sales (profit as % of sales before interest, taxes, depreciations and amortizations EBITDA, roughly the same as gross profit) | |