

# Management Consultant Competencies for Environmental, Social, and Governance-Oriented Green Transformation in Taiwan: A BWM–TOPSIS Approach

## Supplementary Materials

The supplementary materials include Supplementary Table S1, which details the literature-based development of the initial 150-item competency pool and its construct-domain mapping; Supplementary Table S2, which reports the descriptive statistics of the formal survey data at the dimension, indicator, and item levels; Supplementary Table S3, which provides the raw response matrix from the 54 valid respondents used in the formal survey; Supplementary Table S4, which presents the full list of the 48 validated competencies following expert content validation; and Supplementary Table S5, which reports the traceable verification of  $\xi^L$  at the major-dimension level. These materials are included to improve transparency regarding item development, descriptive data, empirical inputs, validated competency items, and the verification of the BWM solution.

### Supplementary Table S1. Literature-based item development and construct-domain mapping for the initial 150-item competency pool

This table shows the source basis for each questionnaire item, organized by the five main competency dimensions, and clearly displays the key supporting references. It includes institutional abbreviations such as ISO (International Organization for Standardization), GRI (Global Reporting Initiative), IFRS (International Financial Reporting Standards Foundation), TCFD (Task Force on Climate-related Financial Disclosures), UNEP (United Nations Environment Programme), WBCSD (World Business Council for Sustainable Development), SBTi (Science Based Targets initiative), and ICMCI (International Council of Management Consulting Institutes).

| No.               | Questionnaire Item                                                                                                              | Supporting References |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Major Dimension 1 | Green Knowledge and Skills                                                                                                      | [1,2,9]               |
| Subdimension 1-1  | ESG Professional Knowledge                                                                                                      | [11,12,18]            |
| 1-1-1             | Familiarity with ISO 14064 and the GHG Protocol standards to support firms in preparing carbon inventory reports                | [35–37]               |
| 1-1-2             | Familiarity with Taiwan’s sustainability reporting regulations for listed companies to guide firms in preparing ESG reports     | [38]                  |
| 1-1-3             | Knowledge of the CBAM policy to support firms in developing carbon tariff compliance strategies                                 | [3]                   |
| 1-1-4             | Understanding of the Sustainable Development Goals (SDGs) and their integration into corporate sustainability strategy planning | [4]                   |
| 1-1-5             | Familiarity with the TCFD framework to support firms in disclosing climate-related risks                                        | [16,39]               |
| 1-1-6             | Knowledge of SBTi standards to guide firms in setting science-based carbon reduction targets                                    | [40]                  |
| Subdimension 1-2  | Environmental Regulations and Policies                                                                                          | [3,41–44]             |
| 1-2-1             | Understanding Taiwan’s Climate Change Response Act to aid corporate compliance                                                  | [41,44]               |
| 1-2-2             | Understanding of the European Green Deal to guide firms in responding to international regulations                              | [3]                   |

|                  |                                                                                                                                     |               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1-2-3            | Familiarity with environmental impact assessment procedures to support project review                                               | [42,43]       |
| 1-2-4            | Understanding of local environmental regulations to support firms in adapting to regional policies                                  | [3,4,41,44]   |
| 1-2-5            | Familiarity with ISO 14001 environmental management systems to support firms in establishing institutionalized management processes | [43]          |
| 1-2-6            | Knowledge of net-zero pathways and regulatory trends to support firms in responding to future policy developments                   | [41,44]       |
| Subdimension 1-3 | Green Finance Knowledge                                                                                                             | [3,41–43]     |
| 1-3-1            | Familiarity with green bond issuance procedures to support corporate financing                                                      | [2]           |
| 1-3-2            | Understanding of ESG investment evaluation criteria to guide firms in attracting investment                                         | [45]          |
| 1-3-3            | Knowledge of carbon trading market mechanisms to support firms in participating in carbon trading                                   | [36]          |
| 1-3-4            | Familiarity with sustainable insurance products to reduce corporate environmental risks                                             | [2,16]        |
| 1-3-5            | Understanding of green credit policies to guide firms in applying for financing                                                     | [2]           |
| 1-3-6            | Knowledge of ESG rating methodologies to enhance firms' investment attractiveness                                                   | [46,47]       |
| Subdimension 1-4 | Sustainable Supply Chain Management                                                                                                 | [33,34,48–52] |
| 1-4-1            | Ability to design sustainable supply chain audit procedures to ensure supplier compliance                                           | [49]          |
| 1-4-2            | Ability to assess supply chain carbon footprints and optimize logistics efficiency                                                  | [49,50]       |
| 1-4-3            | Ability to support ESG reviews in financial-sector supply chains and enhance investment credibility                                 | [49]          |
| 1-4-4            | Ability to promote the circular economy and facilitate product reuse                                                                | [53,54]       |
| 1-4-5            | Ability to design supplier ESG rating systems to identify sustainable business partners                                             | [48,49,51]    |
| 1-4-6            | Ability to integrate green procurement policies to reduce the environmental impacts of supply chains                                | [49,50]       |
| Subdimension 1-5 | Green Technology Application                                                                                                        | [16,54–58,52] |
| 1-5-1            | Ability to use ISO 50001 energy management systems to optimize organizational energy efficiency                                     | [59]          |
| 1-5-2            | Ability to apply carbon footprint analysis tools to quantify product emissions                                                      | [36,37,50]    |
| 1-5-3            | Ability to integrate AI and big data to analyze sustainable supply chain efficiency                                                 | [49,57,58]    |
| 1-5-4            | Ability to use blockchain technology to ensure supply chain data transparency                                                       | [49,52]       |

|                   |                                                                                                   |                              |
|-------------------|---------------------------------------------------------------------------------------------------|------------------------------|
| 1-5-5             | Ability to apply IoT technology to monitor organizational energy use                              | [58]                         |
| 1-5-6             | Ability to integrate 5G technology to improve green manufacturing efficiency                      | [58]                         |
| <b>No.</b>        | <b>Questionnaire Item</b>                                                                         | <b>Supporting References</b> |
| Major Dimension 2 | Organizational Change Capability                                                                  | [5,6,9,10,27,29]             |
| Subdimension 2-1  | Strategic Planning and Leadership                                                                 | [9,10,16,48,51,53,67]        |
| 2-1-1             | Ability to formulate corporate green transformation strategies and set net-zero targets           | [40,41,51]                   |
| 2-1-2             | Ability to lead cross-functional ESG projects and ensure strategic consistency in implementation  | [18]                         |
| 2-1-3             | Ability to design change management plans to promote organizational cultural transformation       | [6,9,10]                     |
| 2-1-4             | Ability to formulate ESG project KPIs to track strategic progress                                 | [7]                          |
| 2-1-5             | Ability to lead cross-national sustainability projects and adapt to international requirements    | [3,4,39]                     |
| 2-1-6             | Ability to design change communication plans to enhance employee engagement                       | [63]                         |
| Subdimension 2-2  | Process Optimization                                                                              | [33,50,52,55,56,57,58]       |
| 2-2-1             | Ability to optimize organizational processes to reduce carbon emissions and resource waste        | [36,43,50]                   |
| 2-2-2             | Ability to implement lean management to improve the efficiency of sustainable operations          | [58]                         |
| 2-2-3             | Ability to design digitalized processes to accelerate ESG data collection                         | [52,57,58]                   |
| 2-2-4             | Ability to optimize manufacturing processes to reduce energy consumption                          | [43,50,59]                   |
| 2-2-5             | Ability to introduce automation technologies to improve green operational efficiency              | [58]                         |
| 2-2-6             | Ability to apply process mining to identify ESG process bottlenecks and improvement opportunities | [58]                         |
| Subdimension 2-3  | Organizational Coordination                                                                       | [9,10,12,48,51,64,67]        |
| 2-3-1             | Ability to coordinate cross-departmental resources to ensure smooth ESG project implementation    | [18]                         |
| 2-3-2             | Ability to establish internal change teams to foster a sustainability-oriented culture            | [6,9,10]                     |
| 2-3-3             | Ability to coordinate with international suppliers to ensure consistency in ESG standards         | [35,49,51]                   |
| 2-3-4             | Ability to manage interdepartmental conflict to improve project efficiency                        | [9,10]                       |
| 2-3-5             | Ability to integrate cross-departmental data to support ESG decision making                       | [18]                         |

|                   |                                                                                                            |                              |
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| 2-3-6             | Ability to establish cross-departmental training programs to enhance collaboration                         | [12,18]                      |
| Subdimension 2-4  | Change Evaluation                                                                                          | [7,30,49,56,68,69,72]        |
| 2-4-1             | Ability to design ESG project performance evaluation frameworks to track progress                          | [58,66]                      |
| 2-4-2             | Ability to analyze resistance to change and propose improvement strategies                                 | [6,9,10]                     |
| 2-4-3             | Ability to evaluate the ROI of ESG projects to demonstrate investment value                                | [45,71,72]                   |
| 2-4-4             | Ability to design employee satisfaction surveys to understand the effects of change                        | [9,10]                       |
| 2-4-5             | Ability to analyze failed change cases and propose preventive measures                                     | [9,10]                       |
| 2-4-6             | Ability to establish long-term change tracking mechanisms to ensure continuous improvement                 | [6,9,10]                     |
| Subdimension 2-5  | Risk Management                                                                                            | [16,45,46,47,60,65,67]       |
| 2-5-1             | Ability to assess green transformation risks and develop response plans                                    | [16]                         |
| 2-5-2             | Ability to identify supply chain risks to ensure sustainability compliance                                 | [16,49]                      |
| 2-5-3             | Ability to analyze climate-related risks to protect corporate assets                                       | [16]                         |
| 2-5-4             | Ability to assess risks arising from regulatory change and maintain compliance                             | [16]                         |
| 2-5-5             | Ability to design crisis management plans to respond to ESG controversies                                  | [47,60,65]                   |
| 2-5-6             | Ability to apply scenario analysis to predict sustainability risks                                         | [16]                         |
| <b>No.</b>        | <b>Questionnaire Item</b>                                                                                  | <b>Supporting References</b> |
| Major Dimension 3 | Communication and Advocacy Skills                                                                          | [5,9,10,12,18,63]            |
| Subdimension 3-1  | Internal and External Communication                                                                        | [5,9,10,12,18,63,67]         |
| 3-1-1             | Ability to communicate ESG strategies with senior executives to gain managerial support                    | [63]                         |
| 3-1-2             | Ability to negotiate with stakeholders to ensure consensus on sustainability projects                      | [4,5,35]                     |
| 3-1-3             | Ability to communicate with investors to enhance ESG investment attractiveness                             | [45,63]                      |
| 3-1-4             | Ability to engage in dialogue with community representatives to promote local sustainability collaboration | [4,35]                       |
| 3-1-5             | Ability to design internal communication plans to enhance employee participation in ESG initiatives        | [63]                         |
| 3-1-6             | Ability to communicate with government agencies to ensure policy alignment                                 | [63]                         |

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| Subdimension<br>3-2 | Sustainability Advocacy                                                                            | [4,6,35,40,47,51,63]         |
| 3-2-1               | Ability to promote corporate ESG values to enhance organizational sustainability image             | [48,51,63]                   |
| 3-2-2               | Ability to participate in industry forums and share green transformation cases                     | [51,52,58]                   |
| 3-2-3               | Ability to apply for ESG awards to enhance corporate reputation                                    | [35,47]                      |
| 3-2-4               | Ability to collaborate with the media to publicize sustainability achievements                     | [51,63]                      |
| 3-2-5               | Ability to design sustainability marketing strategies to attract green consumers                   | [48,51,63]                   |
| 3-2-6               | Ability to promote green innovation cases to stimulate industry influence                          | [71]                         |
| Subdimension<br>3-3 | Training and Education                                                                             | [11,12,18,24,27,54,63]       |
| 3-3-1               | Ability to train employees to strengthen internal sustainability awareness                         | [12]                         |
| 3-3-2               | Ability to design ESG courses to promote green knowledge                                           | [11,12,18]                   |
| 3-3-3               | Ability to organize executive sustainability workshops to strengthen decision-making capability    | [11,12,54]                   |
| 3-3-4               | Ability to design cross-departmental ESG training to promote collaboration                         | [12,18]                      |
| 3-3-5               | Ability to provide online sustainability courses to enhance learning accessibility                 | [11,12,18]                   |
| 3-3-6               | Ability to collaborate with academic institutions to develop professional training programs        | [12]                         |
| Subdimension<br>3-4 | Cross-Cultural Communication                                                                       | [12,48,51,53,64,67]          |
| 3-4-1               | Ability to communicate with international stakeholders to respond to cross-border ESG requirements | [63]                         |
| 3-4-2               | Ability to adapt to multicultural contexts and promote global sustainability standards             | [4,35,42]                    |
| 3-4-3               | Ability to use multilingual competence to improve international communication efficiency           | [63]                         |
| 3-4-4               | Ability to design cross-cultural training programs to support global project collaboration         | [5,12]                       |
| 3-4-5               | Understanding of international ESG requirements to ensure cross-border compliance                  | [39,61,62]                   |
| 3-4-6               | Ability to manage conflict in multinational teams to improve project efficiency                    | [9,10]                       |
| Subdimension<br>3-5 | Reporting and Presentation                                                                         | [35,39,46,47,58,61,62,71,72] |
| 3-5-1               | Ability to prepare ESG reports and presentations to demonstrate sustainability outcomes            | [35]                         |
| 3-5-2               | Ability to visualize data to enhance the persuasiveness of reports                                 | [35]                         |

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| 3-5-3             | Ability to design investor presentations to improve ESG attractiveness                | [46,71,72]                   |
| 3-5-4             | Ability to prepare public disclosure reports to meet regulatory requirements          | [35]                         |
| 3-5-5             | Ability to develop interactive presentations to increase client engagement            | [51,63]                      |
| 3-5-6             | Ability to use digital tools to optimize report preparation efficiency                | [35]                         |
| <b>No.</b>        | <b>Questionnaire Item</b>                                                             | <b>Supporting References</b> |
| Major Dimension 4 | Data Analysis and Technical Application                                               | [7,18,30,32,52,56,58]        |
| Subdimension 4-1  | Data Analysis Capability                                                              | [7,30,32,56,68,69,72]        |
| 4-1-1             | Ability to use Python to analyze ESG data and generate insights                       | [58]                         |
| 4-1-2             | Ability to apply statistical models to predict sustainability risks                   | [16,58]                      |
| 4-1-3             | Ability to use machine learning to predict carbon emission trends                     | [58]                         |
| 4-1-4             | Ability to apply time-series analysis to optimize ESG data processing                 | [58]                         |
| 4-1-5             | Ability to design data-cleaning procedures to ensure data accuracy                    | [51,63]                      |
| 4-1-6             | Ability to use business intelligence tools to visualize ESG performance               | [58]                         |
| Subdimension 4-2  | Digital Tool Application                                                              | [18,33,52,55,56,57,58]       |
| 4-2-1             | Ability to use carbon management software to monitor organizational emissions         | [36,50]                      |
| 4-2-2             | Ability to apply blockchain technology to ensure supply chain transparency            | [49,52]                      |
| 4-2-3             | Ability to integrate ERP systems to optimize ESG data management                      | [51,52,63]                   |
| 4-2-4             | Ability to use cloud analytics tools to improve data processing efficiency            | [58]                         |
| 4-2-5             | Ability to apply robotic process automation (RPA) to automate ESG reporting processes | [35,58]                      |
| 4-2-6             | Ability to use SaaS platforms to support sustainability project management            | [58]                         |
| Subdimension 4-3  | Performance Monitoring                                                                | [7,30,45,50,58,68,71]        |
| 4-3-1             | Ability to design ESG KPIs to monitor project progress                                | [7]                          |
| 4-3-2             | Ability to analyze ESG data to evaluate investment returns                            | [45,71,72]                   |
| 4-3-3             | Ability to establish real-time monitoring systems to track emission data              | [36,50]                      |
| 4-3-4             | Ability to design benchmarking frameworks to evaluate industry performance            | [35,45,66]                   |

|                   |                                                                                              |                              |
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| 4-3-5             | Ability to analyze failed ESG projects and propose improvement recommendations               | [47,60]                      |
| 4-3-6             | Ability to establish long-term performance tracking systems to ensure continuous improvement | [58]                         |
| Subdimension 4-4  | Technical Integration                                                                        | [16,52,54–58]                |
| 4-4-1             | Ability to integrate AI and IoT to optimize energy management                                | [58]                         |
| 4-4-2             | Ability to apply big data to analyze sustainable supply chain efficiency                     | [49,58]                      |
| 4-4-3             | Ability to use 5G technology to improve green manufacturing efficiency                       | [58]                         |
| 4-4-4             | Ability to integrate smart grids to reduce organizational energy consumption                 | [51,52]                      |
| 4-4-5             | Ability to apply AR/VR technologies to simulate sustainability solutions                     | [52,58]                      |
| 4-4-6             | Ability to integrate digital twin technologies to optimize factory emissions                 | [52,57,58]                   |
| Subdimension 4-5  | Innovative Solutions                                                                         | [16,52,54–58]                |
| 4-5-1             | Ability to develop green innovative solutions to enhance organizational competitiveness      | [71]                         |
| 4-5-2             | Ability to design circular economy models to promote product reuse                           | [53,54]                      |
| 4-5-3             | Ability to apply for green patents to protect innovative technologies                        | [71]                         |
| 4-5-4             | Ability to design innovative financing models to support sustainability projects             | [71]                         |
| 4-5-5             | Ability to integrate green technologies to promote smart city projects                       | [2,4,51]                     |
| 4-5-6             | Ability to develop digital platforms to promote collaboration in sustainability innovation   | [71]                         |
| <b>No.</b>        | <b>Questionnaire Item</b>                                                                    | <b>Supporting References</b> |
| Major Dimension 5 | Ethics and Professional Responsibility                                                       | [4,9,10,24,40,42,44]         |
| Subdimension 5-1  | Ethical Decision Making                                                                      | [5,9,10,40,42]               |
| 5-1-1             | Commitment to ESG ethical principles to promote transparency in decision-making              | [42]                         |
| 5-1-2             | Ability to identify greenwashing risks to protect corporate reputation                       | [16,60]                      |
| 5-1-3             | Ability to manage conflicts of interest to guarantee fair decision-making.                   | [42]                         |
| 5-1-4             | Ability to conduct ethical audits to ensure project compliance                               | [42]                         |
| 5-1-5             | Ability to design ethical decision-making frameworks to guide ESG strategies                 | [5,42,53]                    |
| 5-1-6             | Ability to provide ethics training to strengthen consultants' professional awareness         | [12,42]                      |

|                     |                                                                                                               |                          |
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| Subdimension<br>5-2 | Professional Standards                                                                                        | [9,10,24,35,42,61,62]    |
| 5-2-1               | Committed to the International Consulting Association standards to ensure service quality.                    | [24]                     |
| 5-2-2               | Commitment to regularly updating ESG certifications to strengthen professional competence                     | [18,24]                  |
| 5-2-3               | Commitment to continuous professional development to stay current with emerging trends                        | [11,12,18]               |
| 5-2-4               | Ability to design quality assurance plans to ensure project outcomes                                          | [9,10]                   |
| 5-2-5               | Ability to establish client feedback mechanisms to improve service quality                                    | [9,10]                   |
| 5-2-6               | Knowledge of IFRS S1/S2 and GRI standards for supporting compliant disclosure and double materiality analysis | [35,61,62]               |
| Subdimension<br>5-3 | Social Responsibility                                                                                         | [4,35,42,45,63]          |
| 5-3-1               | Ability to promote corporate participation in social welfare initiatives to strengthen CSR impact             | [4,42]                   |
| 5-3-2               | Ability to support firms in developing diversity and inclusion policies                                       | [4,42]                   |
| 5-3-3               | Ability to support disadvantaged groups to enhance corporate social impact                                    | [4,42]                   |
| 5-3-4               | Ability to participate in community sustainability initiatives to promote local development                   | [4,42]                   |
| 5-3-5               | Ability to design public welfare projects to enhance corporate brand value                                    | [4,42]                   |
| 5-3-6               | Ability to promote fair trade to ensure supply chain ethics                                                   | [42,49]                  |
| Subdimension<br>5-4 | Environmental Responsibility                                                                                  | [1,2,3,36,41–43,50]      |
| 5-4-1               | Ability to promote corporate reduction of environmental footprints to fulfill net-zero commitments            | [1,2,40–43,50]           |
| 5-4-2               | Ability to support firms in developing biodiversity protection plans                                          | [2,4]                    |
| 5-4-3               | Ability to design water resource management plans to reduce environmental impacts                             | [2,4,43]                 |
| 5-4-4               | Commitment to promoting pollution prevention to ensure corporate compliance                                   | [36,43]                  |
| 5-4-5               | Ability to support firms in participating in ecological restoration projects                                  | [2,4]                    |
| 5-4-6               | Ability to design green building strategies to enhance environmental performance                              | [58]                     |
| Subdimension<br>5-5 | Client Trust                                                                                                  | [9,10,36,37,40,45,47,60] |
| 5-5-1               | Ability to build long-term client trust to ensure project renewal                                             | [47]                     |
| 5-5-2               | Ability to provide transparent ESG advice to enhance client confidence                                        | [6,11,12,18,60]          |

|       |                                                                                         |                 |
|-------|-----------------------------------------------------------------------------------------|-----------------|
| 5-5-3 | Ability to design client satisfaction surveys to improve service experience             | [9,10,66]       |
| 5-5-4 | Ability to manage trust crises and respond rapidly to client concerns                   | [9,10,60]       |
| 5-5-5 | Ability to provide customized ESG solutions to meet client needs                        | [9,10,11,12,18] |
| 5-5-6 | Ability to establish client relationship management systems to strengthen collaboration | [9,10]          |

**Supplementary Table S2. Detailed descriptive statistics for the formal survey data at the dimension, indicator, and competency-item levels.**

To ensure complete statistical transparency, the detailed descriptive statistics for the formal survey data are shown in Supplementary Tables S2-1 to S2-3, which provide the full descriptive results at the dimension level (M1–M5), indicator level (S1–S25), and competency-item level (T1–T48). Moving these tables to the Supplementary Materials allows the main text to concentrate on key methodological checks and the subsequent multi-criteria decision results.

**Supplementary Table S2-1 Descriptive statistics for the five major dimensions (M1–M5) (N = 54).**

| Item | N  | Mean   | SD     | Min    | Q1     | Median | Q3     | Max    | IQR    | CV     |
|------|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| M1   | 54 | 4.4444 | 0.6914 | 2.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1556 |
| M2   | 54 | 4.2963 | 0.7172 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1669 |
| M3   | 54 | 4.5370 | 0.5734 | 3.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1264 |
| M4   | 54 | 4.4444 | 0.6040 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1359 |
| M5   | 54 | 4.4444 | 0.6040 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1359 |

**Supplementary Table S2-2 Descriptive statistics for the 25 indicators (S1–S25) (N = 54).**

| Item | N  | Mean   | SD     | Min    | Q1     | Median | Q3     | Max    | IQR    | CV     |
|------|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| S1   | 54 | 4.3333 | 0.5494 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1268 |
| S2   | 54 | 4.4444 | 0.5719 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1287 |
| S3   | 54 | 4.0556 | 0.7376 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1819 |
| S4   | 54 | 4.3519 | 0.6489 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1491 |
| S5   | 54 | 4.1296 | 0.728  | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1763 |
| S6   | 54 | 4.463  | 0.5395 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1209 |
| S7   | 54 | 4.3889 | 0.5961 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1358 |
| S8   | 54 | 4.4444 | 0.604  | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1359 |
| S9   | 54 | 4.3148 | 0.7479 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1733 |
| S10  | 54 | 4.4259 | 0.6325 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1429 |
| S11  | 54 | 4.4444 | 0.5719 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1287 |
| S12  | 54 | 4.2963 | 0.6333 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1474 |
| S13  | 54 | 4.463  | 0.5734 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1285 |
| S14  | 54 | 4.2593 | 0.7054 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1656 |
| S15  | 54 | 4.037  | 0.8233 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.2039 |
| S16  | 54 | 4.2593 | 0.7316 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1718 |
| S17  | 54 | 4.2037 | 0.6835 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1626 |
| S18  | 54 | 4.3519 | 0.7046 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1619 |
| S19  | 54 | 4.2593 | 0.757  | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1777 |

|     |    |        |        |        |        |        |        |        |        |        |
|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| S20 | 54 | 4.2407 | 0.7252 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1710 |
| S21 | 54 | 4.3519 | 0.6489 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1491 |
| S22 | 54 | 4.3889 | 0.6845 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1560 |
| S23 | 54 | 4.3519 | 0.7563 | 2.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1738 |
| S24 | 54 | 4.3889 | 0.6564 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1496 |
| S25 | 54 | 4.4815 | 0.6366 | 2.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1421 |

**Supplementary Table S2-3 Descriptive statistics for the 48 competency items (T1–T48) (N = 54).**

| Item | N  | Mean   | SD     | Min    | Q1     | Median | Q3     | Max    | IQR    | CV     |
|------|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| T1   | 54 | 4.3889 | 0.5961 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1358 |
| T2   | 54 | 4.3519 | 0.6773 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1556 |
| T3   | 54 | 4.4074 | 0.567  | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1286 |
| T4   | 54 | 4.3333 | 0.6143 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1418 |
| T5   | 54 | 4.1111 | 0.6635 | 2.0000 | 4.0000 | 4.0000 | 4.7500 | 5.0000 | 0.7500 | 0.1614 |
| T6   | 54 | 4.2593 | 0.6781 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1592 |
| T7   | 54 | 4.1852 | 0.7024 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1678 |
| T8   | 54 | 4.2778 | 0.6564 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1534 |
| T9   | 54 | 4.0926 | 0.6521 | 2.0000 | 4.0000 | 4.0000 | 4.0000 | 5.0000 | 0.0000 | 0.1593 |
| T10  | 54 | 4.3519 | 0.6489 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1491 |
| T11  | 54 | 4.2222 | 0.6344 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1503 |
| T12  | 54 | 4.2222 | 0.7689 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1821 |
| T13  | 54 | 4.4259 | 0.6325 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1429 |
| T14  | 54 | 4.2778 | 0.6564 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1534 |
| T15  | 54 | 4.4259 | 0.6325 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1429 |
| T16  | 54 | 4.4074 | 0.6593 | 3.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1496 |
| T17  | 54 | 4.2778 | 0.6564 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1534 |
| T18  | 54 | 4.3704 | 0.6529 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1494 |
| T19  | 54 | 4.2037 | 0.7618 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1812 |
| T20  | 54 | 4.2593 | 0.6781 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1592 |
| T21  | 54 | 4.4259 | 0.6617 | 3.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1495 |
| T22  | 54 | 4.2593 | 0.7815 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1835 |
| T23  | 54 | 4.2963 | 0.6904 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1607 |
| T24  | 54 | 4.2222 | 0.7439 | 1.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1762 |
| T25  | 54 | 4.2222 | 0.7439 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1762 |
| T26  | 54 | 4.2407 | 0.6711 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1583 |
| T27  | 54 | 4.2222 | 0.7439 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1762 |
| T28  | 54 | 4.1296 | 0.6742 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1633 |
| T29  | 54 | 4.1481 | 0.6561 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1582 |
| T30  | 54 | 4.2963 | 0.768  | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1788 |
| T31  | 54 | 4.2407 | 0.6424 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1515 |
| T32  | 54 | 4.2593 | 0.6497 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1525 |
| T33  | 54 | 4.1481 | 0.7373 | 1.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1778 |
| T34  | 54 | 4.2593 | 0.7815 | 1.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1835 |
| T35  | 54 | 4.2407 | 0.6123 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1444 |
| T36  | 54 | 4.3148 | 0.6391 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1481 |
| T37  | 54 | 4.0926 | 0.6521 | 3.0000 | 4.0000 | 4.0000 | 4.7500 | 5.0000 | 0.7500 | 0.1593 |
| T38  | 54 | 4.0741 | 0.7486 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1838 |

|     |    |        |        |        |        |        |        |        |        |        |
|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| T39 | 54 | 4.1481 | 0.7113 | 3.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1715 |
| T40 | 54 | 4.4815 | 0.6656 | 2.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1485 |
| T41 | 54 | 4.3333 | 0.6729 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1553 |
| T42 | 54 | 4.4444 | 0.7931 | 1.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1784 |
| T43 | 54 | 4.2778 | 0.7871 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.184  |
| T44 | 54 | 4.3333 | 0.6729 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1553 |
| T45 | 54 | 4.2778 | 0.6845 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1600 |
| T46 | 54 | 4.5185 | 0.6063 | 2.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1342 |
| T47 | 54 | 4.3333 | 0.6443 | 2.0000 | 4.0000 | 4.0000 | 5.0000 | 5.0000 | 1.0000 | 0.1487 |
| T48 | 54 | 4.3889 | 0.7376 | 2.0000 | 4.0000 | 4.5000 | 5.0000 | 5.0000 | 1.0000 | 0.1681 |

**Supplementary Table S3. Raw response matrix of the 54 valid formal questionnaires (1/6–6/6).**

Supplementary Table S3 shows the raw response matrix of the 54 valid formal questionnaires used in the empirical analysis. The table is divided into six parts (1/6–6/6) due to space constraints and provides traceable empirical input for subsequent weighting and ranking processes.

| Domain | First-Level |    |    |    |    |    |    |    |    |    | Second-Level Dimensions (1/6) |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|-------------|----|----|----|----|----|----|----|----|----|-------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NO     | M1          | M2 | M3 | M4 | M5 | S1 | S2 | S3 | S4 | S5 | S6                            | S7 | S8 | S9 | S10 | S11 | S12 | S13 | S14 | S15 | S16 | S17 | S18 | S19 | S20 | S21 | S22 | S23 | S24 | S25 |
| 1      | 4           | 5  | 5  | 5  | 4  | 4  | 5  | 5  | 5  | 4  | 5                             | 4  | 4  | 5  | 4   | 5   | 4   | 5   | 5   | 4   | 5   | 4   | 5   | 5   | 4   | 4   | 5   | 4   | 4   | 5   |
| 2      | 5           | 4  | 5  | 4  | 5  | 5  | 4  | 4  | 5  | 5  | 5                             | 5  | 5  | 4  | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 4   | 5   | 5   | 4   | 5   | 5   | 5   |
| 3      | 5           | 5  | 5  | 5  | 5  | 4  | 4  | 5  | 5  | 5  | 5                             | 5  | 4  | 5  | 5   | 5   | 5   | 4   | 5   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 4   | 5   | 5   |
| 4      | 5           | 4  | 4  | 4  | 5  | 5  | 5  | 5  | 5  | 3  | 4                             | 4  | 4  | 5  | 5   | 5   | 5   | 4   | 4   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   |
| 5      | 3           | 4  | 5  | 5  | 5  | 4  | 4  | 3  | 4  | 3  | 4                             | 5  | 5  | 2  | 3   | 4   | 3   | 4   | 4   | 3   | 4   | 4   | 3   | 3   | 5   | 4   | 3   | 5   | 4   | 3   |
| 6      | 4           | 5  | 5  | 5  | 5  | 5  | 5  | 3  | 4  | 5  | 5                             | 4  | 5  | 4  | 5   | 4   | 5   | 5   | 3   | 3   | 5   | 4   | 5   | 5   | 3   | 5   | 5   | 5   | 5   | 4   |
| 7      | 5           | 4  | 4  | 5  | 4  | 4  | 5  | 5  | 4  | 4  | 5                             | 4  | 4  | 4  | 4   | 4   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 5   |
| 8      | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 4  | 5  | 5  | 5                             | 4  | 5  | 5  | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   |
| 9      | 4           | 4  | 4  | 5  | 4  | 4  | 3  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 3   | 3   | 4   | 4   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 10     | 5           | 4  | 5  | 5  | 4  | 4  | 4  | 4  | 4  | 4  | 5                             | 5  | 5  | 5  | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 11     | 4           | 3  | 5  | 4  | 5  | 4  | 5  | 2  | 5  | 4  | 4                             | 3  | 5  | 2  | 3   | 5   | 4   | 4   | 5   | 2   | 3   | 4   | 5   | 5   | 3   | 5   | 4   | 3   | 4   | 2   |
| 12     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 13     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 14     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 15     | 3           | 4  | 4  | 4  | 3  | 4  | 3  | 4  | 5  | 5  | 4                             | 4  | 4  | 5  | 4   | 4   | 5   | 5   | 4   | 4   | 3   | 4   | 5   | 4   | 4   | 4   | 5   | 4   | 4   | 5   |
| 16     | 5           | 5  | 4  | 5  | 4  | 4  | 4  | 4  | 5  | 4  | 5                             | 5  | 4  | 4  | 5   | 5   | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 5   |
| 17     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 18     | 5           | 4  | 3  | 4  | 4  | 4  | 5  | 3  | 4  | 4  | 4                             | 3  | 4  | 5  | 4   | 4   | 4   | 5   | 4   | 3   | 4   | 4   | 5   | 3   | 4   | 4   | 5   | 4   | 4   | 4   |
| 19     | 3           | 5  | 4  | 4  | 5  | 4  | 4  | 3  | 3  | 3  | 4                             | 4  | 4  | 3  | 4   | 4   | 3   | 4   | 3   | 3   | 3   | 4   | 4   | 3   | 4   | 5   | 4   | 4   | 4   | 5   |
| 20     | 5           | 4  | 5  | 5  | 4  | 5  | 5  | 4  | 4  | 4  | 4                             | 4  | 5  | 4  | 5   | 5   | 4   | 5   | 4   | 4   | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 4   | 4   | 5   |
| 21     | 5           | 3  | 4  | 3  | 5  | 4  | 4  | 3  | 4  | 3  | 4                             | 4  | 3  | 4  | 5   | 4   | 4   | 4   | 3   | 3   | 4   | 3   | 4   | 4   | 4   | 4   | 4   | 3   | 4   | 4   |
| 22     | 4           | 4  | 4  | 4  | 5  | 4  | 5  | 4  | 5  | 4  | 4                             | 5  | 5  | 4  | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   |
| 23     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 24     | 4           | 5  | 5  | 4  | 4  | 4  | 5  | 3  | 5  | 4  | 4                             | 5  | 5  | 4  | 4   | 5   | 4   | 4   | 5   | 3   | 4   | 5   | 4   | 5   | 5   | 4   | 4   | 5   | 5   | 5   |
| 25     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 26     | 5           | 5  | 5  | 4  | 4  | 5  | 4  | 3  | 3  | 2  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 3   | 3   | 3   | 4   | 3   | 3   | 4   | 4   | 3   | 4   | 4   |
| 27     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |

| Domain | First-Level |    |    |    |    |    |    |    |    |    | Second-Level Dimensions (2/6) |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|-------------|----|----|----|----|----|----|----|----|----|-------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NO     | M1          | M2 | M3 | M4 | M5 | S1 | S2 | S3 | S4 | S5 | S6                            | S7 | S8 | S9 | S10 | S11 | S12 | S13 | S14 | S15 | S16 | S17 | S18 | S19 | S20 | S21 | S22 | S23 | S24 | S25 |
| 28     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 29     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   |
| 30     | 4           | 4  | 4  | 3  | 3  | 4  | 4  | 4  | 3  | 2  | 4                             | 4  | 4  | 4  | 4   | 4   | 3   | 3   | 3   | 2   | 4   | 4   | 4   | 3   | 3   | 4   | 4   | 3   | 3   | 4   |
| 31     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 32     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 4  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 3   | 4   | 4   | 4   |
| 33     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 34     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 35     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 36     | 4           | 5  | 5  | 4  | 5  | 5  | 4  | 4  | 5  | 4  | 5                             | 5  | 5  | 5  | 5   | 5   | 4   | 5   | 5   | 4   | 4   | 4   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   |
| 37     | 5           | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 38     | 5           | 4  | 5  | 4  | 5  | 4  | 5  | 4  | 5  | 4  | 4                             | 5  | 4  | 5  | 5   | 4   | 4   | 5   | 4   | 4   | 3   | 3   | 4   | 5   | 4   | 5   | 4   | 4   | 4   | 4   |
| 39     | 4           | 5  | 5  | 4  | 5  | 4  | 4  | 4  | 4  | 4  | 5                             | 4  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 40     | 4           | 4  | 5  | 4  | 4  | 4  | 5  | 4  | 4  | 5  | 5                             | 5  | 4  | 5  | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 4   | 4   | 5   | 5   | 4   |
| 41     | 5           | 5  | 5  | 5  | 5  | 4  | 4  | 5  | 5  | 5  | 5                             | 4  | 5  | 5  | 5   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 4   |
| 42     | 5           | 4  | 4  | 5  | 4  | 5  | 5  | 5  | 4  | 4  | 5                             | 4  | 4  | 4  | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 4   | 4   |
| 43     | 5           | 5  | 5  | 5  | 5  | 4  | 4  | 4  | 4  | 4  | 4                             | 5  | 5  | 4  | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 5   | 5   |
| 44     | 5           | 3  | 4  | 4  | 4  | 3  | 4  | 3  | 3  | 3  | 3                             | 4  | 3  | 3  | 3   | 3   | 4   | 4   | 3   | 3   | 4   | 4   | 3   | 3   | 3   | 2   | 2   | 2   | 2   | 4   |
| 45     | 5           | 4  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 4  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   |
| 46     | 5           | 4  | 3  | 3  | 5  | 4  | 5  | 5  | 5  | 4  | 4                             | 5  | 5  | 5  | 5   | 4   | 4   | 4   | 4   | 4   | 3   | 3   | 3   | 4   | 4   | 5   | 5   | 5   | 5   | 5   |
| 47     | 5           | 5  | 5  | 5  | 4  | 5  | 5  | 4  | 4  | 4  | 4                             | 3  | 3  | 3  | 4   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 4   | 5   | 5   | 5   | 5   |
| 48     | 4           | 3  | 4  | 4  | 3  | 3  | 4  | 3  | 4  | 4  | 4                             | 4  | 4  | 4  | 3   | 4   | 3   | 4   | 3   | 3   | 3   | 4   | 4   | 4   | 4   | 4   | 3   | 3   | 4   | 4   |
| 49     | 5           | 5  | 5  | 5  | 4  | 4  | 4  | 4  | 4  | 4  | 5                             | 5  | 5  | 5  | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   |
| 50     | 2           | 2  | 5  | 5  | 4  | 5  | 5  | 4  | 4  | 4  | 5                             | 5  | 5  | 4  | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   |
| 51     | 4           | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 52     | 4           | 3  | 4  | 5  | 5  | 5  | 4  | 4  | 3  | 4  | 5                             | 4  | 5  | 4  | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 4   | 5   | 5   | 4   | 4   | 5   | 5   | 5   |
| 53     | 4           | 4  | 5  | 4  | 4  | 4  | 4  | 4  | 4  | 4  | 4                             | 4  | 4  | 4  | 4   | 5   | 4   | 5   | 4   | 5   | 3   | 2   | 2   | 2   | 2   | 4   | 4   | 4   | 4   | 5   |
| 54     | 5           | 5  | 5  | 5  | 5  | 4  | 5  | 3  | 5  | 5  | 5                             | 5  | 5  | 5  | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |

| Domain | Third-Level Dimensions (3/6) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NO     | T25                          | T26 | T27 | T28 | T29 | T30 | T31 | T32 | T33 | T34 | T35 | T36 | T37 | T38 | T39 | T40 | T41 | T42 | T43 | T44 | T45 | T46 | T47 | T48 |
| 1      | 5                            | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 5   | 4   | 5   | 5   | 4   | 4   | 5   | 5   | 4   | 5   | 4   | 4   | 5   | 4   | 4   |
| 2      | 5                            | 4   | 5   | 4   | 5   | 4   | 4   | 5   | 4   | 5   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 4   |
| 3      | 5                            | 5   | 4   | 5   | 4   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 4   |
| 4      | 4                            | 5   | 5   | 4   | 5   | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 4   | 4   | 3   | 4   |
| 5      | 4                            | 3   | 4   | 4   | 3   | 3   | 5   | 3   | 2   | 5   | 3   | 2   | 4   | 3   | 4   | 4   | 3   | 3   | 3   | 4   | 4   | 3   | 4   | 4   |
| 6      | 5                            | 5   | 4   | 5   | 3   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 4   | 5   | 3   | 5   | 5   | 3   | 4   | 5   |
| 7      | 5                            | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 3   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 4   |
| 8      | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 5   | 4   | 5   |
| 9      | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 3   | 3   | 4   | 4   | 4   | 5   |
| 10     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 4   | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 4   |
| 11     | 4                            | 2   | 5   | 3   | 4   | 5   | 4   | 2   | 3   | 4   | 4   | 3   | 5   | 3   | 5   | 3   | 5   | 4   | 2   | 5   | 5   | 2   | 5   | 1   |
| 12     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 13     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 14     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |

|    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 3 | 3 | 4 | 5 |
| 16 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 17 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| 18 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 |
| 19 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 |
| 20 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 |
| 21 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 22 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 4 |
| 23 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 |
| 24 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 |
| 25 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 |
| 26 | 5 | 4 | 4 | 4 | 2 | 3 | 2 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 27 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| Domain | Third-Level Dimensions (4/6) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NO     | T25                          | T26 | T27 | T28 | T29 | T30 | T31 | T32 | T33 | T34 | T35 | T36 | T37 | T38 | T39 | T40 | T41 | T42 | T43 | T44 | T45 | T46 | T47 | T48 |
| 29     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 30     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 31     | 4                            | 4   | 4   | 4   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 4   | 4   | 2   | 3   |
| 32     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 33     | 4                            | 4   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   |
| 34     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 35     | 4                            | 4   | 4   | 3   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   |
| 36     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 37     | 5                            | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 38     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   |
| 39     | 4                            | 5   | 5   | 4   | 4   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 5   | 4   | 4   | 5   | 4   | 4   | 4   | 4   | 5   | 4   | 4   | 4   |
| 40     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 41     | 4                            | 4   | 4   | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 4   | 5   | 5   | 4   | 5   | 5   | 4   | 4   |
| 42     | 3                            | 3   | 3   | 3   | 4   | 3   | 3   | 4   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 4   | 4   | 4   | 3   | 3   | 4   | 3   | 3   | 3   |
| 43     | 5                            | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 4   | 4   | 4   | 4   | 5   | 4   | 5   | 5   | 4   | 4   |
| 44     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 45     | 4                            | 5   | 4   | 4   | 4   | 3   | 3   | 4   | 3   | 4   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 4   | 3   | 3   | 3   |
| 46     | 5                            | 5   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   |
| 47     | 4                            | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   |
| 48     | 5                            | 5   | 5   | 5   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 4   |
| 49     | 4                            | 4   | 4   | 4   | 3   | 3   | 4   | 4   | 4   | 4   | 4   | 3   | 4   | 5   | 5   | 4   | 3   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| 50     | 5                            | 5   | 4   | 5   | 4   | 4   | 5   | 5   | 4   | 5   | 4   | 4   | 4   | 4   | 5   | 4   | 4   | 5   | 4   | 4   | 3   | 3   | 4   | 4   |
| 51     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   |
| 52     | 5                            | 5   | 5   | 5   | 4   | 5   | 4   | 4   | 5   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 4   |
| 53     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 4   |
| 54     | 5                            | 4   | 4   | 4   | 2   | 3   | 2   | 4   | 4   | 4   | 3   | 3   | 4   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   |

| Domain | Third-Level Dimensions (5/6) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|--------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NO     | T25                          | T26 | T27 | T28 | T29 | T30 | T31 | T32 | T33 | T34 | T35 | T36 | T37 | T38 | T39 | T40 | T41 | T42 | T43 | T44 | T45 | T46 | T47 | T48 |
| 1      | 5                            | 4   | 5   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 5   | 5   | 4   | 5   | 4   | 5   | 4   | 5   | 5   | 4   | 5   | 5   | 5   | 4   |

|    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2  | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 |
| 3  | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 |
| 4  | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 |
| 5  | 3 | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 3 | 2 |
| 6  | 3 | 5 | 5 | 3 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 3 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 5 |
| 7  | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 |
| 8  | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 9  | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| 10 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 11 | 2 | 5 | 2 | 4 | 3 | 5 | 4 | 4 | 1 | 1 | 5 | 4 | 3 | 2 | 3 | 5 | 5 | 1 | 2 | 5 | 3 | 4 | 4 | 5 |
| 12 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 13 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 14 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 5 |
| 16 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 17 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 5 |
| 18 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 5 |
| 19 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 3 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 5 | 4 |
| 20 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 |
| 21 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| 22 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |
| 23 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 24 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 |
| 25 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 26 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 27 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| Domain | Third-Level Dimensions (6/6) |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |
|--------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|--|--|
| NO     | T25                          | T26 | T27 | T28 | T29 | T30 | T31 | T32 | T33 | T34 | T35 | T36 | T37 | T38 | T39 | T40 | T41 | T42 | T43 | T44 | T45 | T46 | T47 | T48 |   |  |  |
| 29     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4 |  |  |
| 30     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 31     | 3                            | 3   | 3   | 3   | 4   | 3   | 4   | 4   | 3   | 3   | 3   | 4   | 3   | 3   | 3   | 3   | 3   | 4   | 3   | 3   | 3   | 4   | 4   | 3   |   |  |  |
| 32     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 33     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4 |  |  |
| 34     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 35     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4 |  |  |
| 36     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 37     | 5                            | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 38     | 5                            | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5   | 5 |  |  |
| 39     | 4                            | 4   | 4   | 4   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 4 |  |  |
| 40     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4 |  |  |
| 41     | 4                            | 4   | 5   | 4   | 4   | 5   | 4   | 5   | 5   | 5   | 4   | 5   | 5   | 4   | 4   | 5   | 5   | 4   | 4   | 5   | 4   | 5   | 4   | 5   | 4 |  |  |
| 42     | 3                            | 4   | 4   | 3   | 3   | 3   | 3   | 3   | 4   | 4   | 3   | 3   | 4   | 4   | 3   | 4   | 4   | 4   | 4   | 4   | 3   | 4   | 4   | 4   | 4 |  |  |
| 43     | 5                            | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 5   | 5   | 4   | 4   | 5   | 5   | 5   | 4   | 4 |  |  |
| 44     | 4                            | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 5   | 4   | 4   | 4   | 5   | 5   | 5   | 5   | 4   | 5   | 5   | 5   | 5   | 5 |  |  |
| 45     | 3                            | 3   | 3   | 3   | 3   | 3   | 4   | 4   | 4   | 4   | 5   | 4   | 3   | 3   | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2 |  |  |

|    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 |   |
| 47 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 |   |
| 48 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 |   |
| 49 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 |
| 50 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 |
| 51 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 |
| 52 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 53 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 |
| 54 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 |

**Supplementary Table S4. Full list of 48 validated competency items following expert content validation**

| Main Dimension                      | Secondary Dimension                        | Revised Third-Level Competency Item                                                                                                   |
|-------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1. Green Knowledge and Skills       | 1-1 ESG Professional Knowledge             | 1-1-1 Knowledge of ISO 14064-1 and the GHG Protocol for supporting corporate carbon inventory reporting                               |
| 1. Green Knowledge and Skills       | 1-1 ESG Professional Knowledge             | 1-1-2 Familiarity with Taiwan's sustainability reporting regulations for listed companies to guide firms in preparing ESG reports     |
| 1. Green Knowledge and Skills       | 1-1 ESG Professional Knowledge             | 1-1-3 Understanding of the Sustainable Development Goals (SDGs) and their integration into corporate sustainability strategy planning |
| 1. Green Knowledge and Skills       | 1-1 ESG Professional Knowledge             | 1-1-4 Knowledge of the Task Force on Climate-related Financial Disclosures (TCFD) framework for supporting climate risk disclosure    |
| 1. Green Knowledge and Skills       | 1-1 ESG Professional Knowledge             | 1-1-5 Knowledge of the Science Based Targets initiative (SBTi) standards for assisting with science-based target setting.             |
| 1. Green Knowledge and Skills       | 1-2 Environmental Regulations and Policies | 1-2-1 Knowledge of Taiwan's Climate Change Response Act for supporting corporate compliance                                           |
| 1. Green Knowledge and Skills       | 1-2 Environmental Regulations and Policies | 1-2-2 Understanding of the European Green Deal for supporting organizational responses to international regulations                   |
| 1. Green Knowledge and Skills       | 1-2 Environmental Regulations and Policies | 1-2-3 Knowledge of environmental impact assessment procedures for supporting project review processes                                 |
| 1. Green Knowledge and Skills       | 1-3 Green Finance Knowledge                | 1-3-1 Knowledge of green bond issuance procedures for supporting corporate financing                                                  |
| 1. Green Knowledge and Skills       | 1-3 Green Finance Knowledge                | 1-3-2 Understanding of ESG investment evaluation criteria for supporting investment attraction                                        |
| 1. Green Knowledge and Skills       | 1-4 Sustainable Supply Chain Management    | 1-4-1 Ability to design sustainable supply chain audit procedures to ensure supplier compliance                                       |
| 1. Green Knowledge and Skills       | 1-4 Sustainable Supply Chain Management    | 1-4-2 Ability to assess supply chain carbon footprints and improve logistics efficiency                                               |
| 1. Green Knowledge and Skills       | 1-5 Green Technology Application           | 1-5-1 Ability to apply ISO 50001 energy management systems to improve organizational energy efficiency                                |
| 1. Green Knowledge and Skills       | 1-5 Green Technology Application           | 1-5-2 Ability to apply carbon footprint analysis tools to quantify product emissions                                                  |
| 2. Organizational Change Capability | 2-1 Strategic Planning and Leadership      | 2-1-1 Ability to develop green transformation strategies and set net-zero targets                                                     |
| 2. Organizational Change Capability | 2-1 Strategic Planning and Leadership      | 2-1-2 Ability to lead cross-functional ESG projects and ensure strategic alignment in implementation                                  |
| 2. Organizational Change Capability | 2-2 Process Optimization                   | 2-2-1 Ability to optimize organizational processes to reduce carbon emissions and resource waste                                      |
| 2. Organizational Change Capability | 2-3 Organizational Coordination            | 2-3-1 Ability to coordinate cross-departmental resources to support smooth ESG project implementation                                 |

|                                             |                                         |                                                                                                           |
|---------------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 2. Organizational Change Capability         | 2-3 Organizational Coordination         | 2-3-2 Ability to establish internal change teams to foster a sustainability-oriented culture              |
| 2. Organizational Change Capability         | 2-3 Organizational Coordination         | 2-3-3 Ability to integrate cross-departmental data to support ESG-related decision making                 |
| 2. Organizational Change Capability         | 2-4 Change Evaluation                   | 2-4-1 Ability to design ESG project performance evaluation frameworks for progress tracking               |
| 2. Organizational Change Capability         | 2-4 Change Evaluation                   | 2-4-2 Ability to evaluate the return on investment (ROI) of ESG projects to demonstrate investment value  |
| 2. Organizational Change Capability         | 2-5 Risk Management                     | 2-5-1 Ability to assess green transformation risks and develop response plans                             |
| 2. Organizational Change Capability         | 2-5 Risk Management                     | 2-5-2 Ability to identify supply chain risks to ensure sustainability compliance                          |
| 2. Organizational Change Capability         | 2-5 Risk Management                     | 2-5-3 Ability to assess risks arising from regulatory changes and maintain compliance                     |
| 3. Communication and Advocacy Skills        | 3-1 Internal and External Communication | 3-1-1 Ability to negotiate with stakeholders and build consensus on sustainability initiatives            |
| 3. Communication and Advocacy Skills        | 3-1 Internal and External Communication | 3-1-2 Ability to design internal communication plans to enhance employee participation in ESG initiatives |
| 3. Communication and Advocacy Skills        | 3-2 Sustainability Advocacy             | 3-2-1 Ability to promote corporate ESG values and strengthen the organization's sustainability image      |
| 3. Communication and Advocacy Skills        | 3-3 Training and Education              | 3-3-1 Ability to design ESG training programs to promote green knowledge                                  |
| 3. Communication and Advocacy Skills        | 3-3 Training and Education              | 3-3-2 Ability to organize executive sustainability workshops to strengthen decision-making capability     |
| 3. Communication and Advocacy Skills        | 3-3 Training and Education              | 3-3-3 Ability to design cross-functional ESG training to facilitate collaboration                         |
| 3. Communication and Advocacy Skills        | 3-4 Cross-Cultural Communication        | 3-4-1 Understanding of international ESG requirements for supporting cross-border compliance              |
| 3. Communication and Advocacy Skills        | 3-5 Reporting and Presentation          | 3-5-1 Ability to prepare ESG reports and presentations to demonstrate sustainability outcomes             |
| 4. Data Analysis and Technical Applications | 4-1 Data Analysis Capabilities          | 4-1-1 Ability to apply statistical models to predict sustainability-related risks                         |
| 4. Data Analysis and Technical Applications | 4-2 Digital Tool Application            | 4-2-1 Ability to use carbon management software to monitor organizational emissions                       |
| 4. Data Analysis and Technical Applications | 4-3 Performance Monitoring              | 4-3-1 Ability to design ESG key performance indicators (KPIs) to monitor project progress                 |
| 4. Data Analysis and Technical Applications | 4-3 Performance Monitoring              | 4-3-2 Ability to design benchmarking frameworks to evaluate industry performance                          |
| 4. Data Analysis and Technical Applications | 4-4 Technical Integration               | 4-4-1 Ability to integrate AI and IoT technologies to improve energy management                           |
| 4. Data Analysis and Technical Applications | 4-4 Technical Integration               | 4-4-2 Ability to integrate digital twin technologies to improve factory emissions management              |
| 4. Data Analysis and Technical Applications | 4-5 Innovative Solutions                | 4-5-1 Ability to develop green innovative solutions to enhance organizational competitiveness             |
| 4. Data Analysis and Technical Applications | 4-5 Innovative Solutions                | 4-5-2 Ability to design circular economy models to promote product reuse                                  |
| 5. Ethics and Professional Responsibility   | 5-1 Ethical Decision Making             | 5-1-1 Commitment to ESG ethical principles to promote transparency in decision-making.                    |
| 5. Ethics and Professional Responsibility   | 5-2 Professional Standards              | 5-2-1 Dedication to meeting international consulting association standards to ensure service quality.     |
| 5. Ethics and Professional Responsibility   | 5-2 Professional Standards              | 5-2-2 Commitment to regularly updating ESG-related certifications to enhance professional skills.         |

|                                           |                                  |                                                                                                                                           |
|-------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 5. Ethics and Professional Responsibility | 5-3 Social Responsibility        | 5-3-1 Ability to promote corporate participation in social welfare initiatives to strengthen corporate social responsibility (CSR) impact |
| 5. Ethics and Professional Responsibility | 5-3 Social Responsibility        | 5-3-2 Ability to support firms in developing diversity and inclusion policies                                                             |
| 5. Ethics and Professional Responsibility | 5-4 Environmental Responsibility | 5-4-1 Commitment to promoting pollution prevention practices to ensure corporate compliance                                               |
| 5. Ethics and Professional Responsibility | 5-5 Client Trust                 | 5-5-1 Ability to design client satisfaction surveys to improve service experience                                                         |

**Supplementary Table S5.** Traceable verification of  $\xi^L$  at the M level (N = 54).

| Dimension | Group Mean Score | Best-to-Others Comparison | Others-to-Worst Comparison | Weight Solution | Deviation n 1 | Deviation n 2 | Max (Deviation 1, Deviation 2) |
|-----------|------------------|---------------------------|----------------------------|-----------------|---------------|---------------|--------------------------------|
| M1        | 4.4444           | 4.0769                    | 5.9231                     | 0.1821          | 0.3712        | 0.3065        | 0.3712                         |
| M2(Worst) | 4.2963           | 9.0000                    | 1.0000                     | 0.0825          | 0.3712        | 0.0000        | 0.3712                         |
| M3(Best)  | 4.5370           | 1.0000                    | 9.0000                     | 0.3712          | 0.0000        | 0.3712        | 0.3712                         |
| M4        | 4.4444           | 4.0769                    | 5.9231                     | 0.1821          | 0.3712        | 0.3065        | 0.3712                         |
| M5        | 4.4444           | 4.0769                    | 5.9231                     | 0.1821          | 0.3712        | 0.3065        | 0.3712                         |

**Notes:**

- (1) Supplementary Table S5 presents the detailed verification results for the BWM solution at the major-dimension level (M1–M5). Using the comparison vectors in this study, M3 was identified as the Best criterion and M2 as the Worst criterion [34,35].  
(2) Deviation 1 corresponds to the Best-to-Others constraint,  $|w_B - a_{Bj}w_j|$ , whereas Deviation 2 corresponds to the Others-to-Worst constraint,  $|w_j - a_{jW}w_W|$ . For each dimension  $j$ ,  $\max\_dev\_j$  is defined as the larger of the two deviations, that is,

$$\max(|w_B - a_{Bj}w_j|, |w_j - a_{jW}w_W|).$$

- (3) The final consistency deviation at the M level is obtained as.

$$\xi^L = \max_j (\max\_dev_j) = 0.3712.$$

In the present study, this value should be understood as the traceable minimax deviation of the BWM solution under the current data structure and linear mapping rule, rather than through an earlier threshold-based interpretation [34,35]. (4) It should be clearly distinguished that  $\xi^L$  reflects the fit of the BWM solution to the comparison vectors (solution-level consistency) and is not equivalent to the degree of agreement among the 54 respondents regarding the ranking of the major dimensions. Group-level agreement should instead be interpreted based on Kendall's W, as reported in Table 10 of the main text. (5) Accordingly, Table S5 is provided not to claim a strong consensus at the M level, but to show that the obtained weight vector can be traced, recalculated, and verified using the same comparison inputs and optimization process.

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