

Development of a Competency Model for Executives of the Carbon Credit Trading Industry to Mitigate the Impacts of Global Warming in the Digital Era

SANON BOONMEE*, SUCHART SIENGCHIN, PREEDA ATTAVINIJTRAKARN,
TERAVUTI BOONYASOPON

Industrial Business and Human Resource Development,
King Mongkut's University of Technology North Bangkok,
1518 Pracharat 1 Road, Wongsawang, Bang Sue, Bangkok 10800,
THAILAND

**Corresponding Author*

Abstract: - Global warming and climate change severely impact ecosystems and human safety, positioning the carbon credit market as a vital tool for emission reduction. This study aimed to identify necessary skills, develop a strategic plan, and construct a handbook for digital-age leaders in industrial carbon credit trading. Utilizing the Delphi method and a focus group discussion, data were gathered from 19 experts and stakeholders. Analysis combined qualitative thematic sorting with quantitative median and interquartile range (IQR) metrics. The findings revealed five core management skills (planning, organizing, commanding, coordinating, controlling), detailed into 25 sub-parts and 125 minor parts. This model integrates environmental knowledge with digital technology to enhance measurement, reporting, and verification efficiency. Experts verified the model's appropriateness, resulting in a two-part handbook outlining 12 execution pathways. Specialists confirmed the handbook is highly suitable for leadership development.

Key-Words: - competency model development, industrial carbon credit trading business, carbon credit, digital era, carbon credit traders, global warming, digital management.

Received: March 12, 2026. Revised: June 8, 2026. Accepted: July 8, 2026. Available online: October 5, 2026.

1 Introduction

Global warming and climate change represent an urgent worldwide crisis that has intensified due to the continuous rise in greenhouse gas emissions. This phenomenon has caused a rise in average surface temperatures, resulting in more heatwaves, droughts, and severe storms. It also creates risks to ecosystems, economies, and the health of people [1]. These trends show that human activities, like the use of fossil fuels, travel, changes in the land use, and manufacturing, are increasing the greenhouse effect. These activities release massive amounts of greenhouse gases which put great pressure on water resources, food security, and national infrastructure [2], [3].

As shown in Figure 1, global average surface temperatures have risen consistently over the past several decades. This rise in temperatures shows that current efforts to stop greenhouse gases are not enough, and leaders in industries like carbon trading need to have the skills to match the size and urgency of this problem. We used the temperature data shown

in Figure 1 to start the interviews with the Delphi method and to show why research on carbon market management is important.

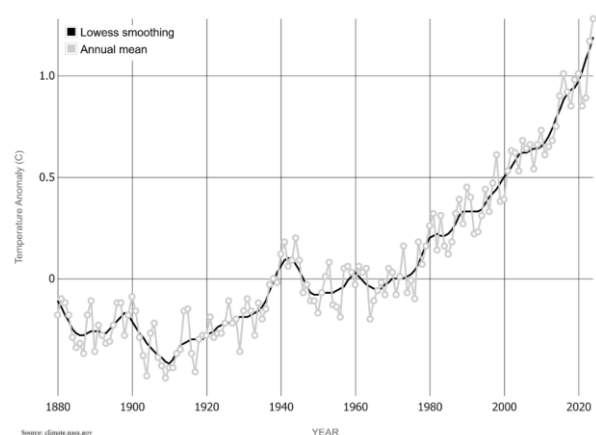


Fig. 1: Graph showing global average temperature trends

Source: National Aeronautics and Space Administration, 2024 [4]

In Thailand, evidence of climate change is becoming more obvious; temperatures are rising, there are more extreme weather events, and more damage from floods and droughts that affect the agricultural sector and the broader economy [5]. Thailand has set important targets to fight climate change. It plans to be carbon neutral by 2050 and to reach net-zero greenhouse gas emissions by 2065. At the same time, it has created a special plan called the Bio-Circular-Green Economy (BCG) to grow a sustainable economy; this will help it meet Sustainable Development Goal 13: Climate Action of the 2015 Paris Agreement [6]. However, businesses still have problems in cutting greenhouse gas emissions because they do not have proper rules, knowledge, data systems, and technology to measure and report their progress [7].

A key mechanism adopted internationally to support greenhouse gas reduction is the carbon credit trading system; a company that reduces emissions more than it is required to do may sell its credits to those that have not yet met their targets. This marketplace mechanism not only encourages companies to be more efficient in reducing emissions but also gives them a financial incentive to do so [7]. Thailand has been developing a system for carbon trading through voluntary schemes, mainly the Thailand Voluntary Emission Reduction Program (T-VER), under the supervision of the Thailand Greenhouse Gas Management Organization (TGO) [8].

The effectiveness of carbon credit programs depends on more than good regulations or market systems. It also relies on competent executives and staff in planning, management of resources, stakeholder collaboration, and tracking results. This is particularly true in the digital age, as data and technology are essential to ensure honesty, transparency, and traceability in carbon credit systems. Digital technologies such as artificial intelligence, big data analytics, blockchain, and the Internet of Things are being used more than ever to measure, report, and verify data relating to the environment. However, many organizations still do not have the leadership or digital skills to combine these new technologies with business plans.

Our review of the existing literature shows that there is no specific guide for training carbon credit managers in Thailand. In this study, we have created a skills model for business leaders in the industrial carbon credit market called the "Managerial Competency Model for Industrial Carbon Credit Trading Business Executives to Mitigate the Impacts of Global Warming in the Digital Era". It draws on the POCCC framework [9], the 4M Resources

Framework [10], the Knowledge, Skills, and Attitudes (KSA) framework [11], and ESG principles, with the goal of helping these executives address global warming in the digital age.

2 Research Methodology

In this study, we have used interviews and research to establish the skills needed for leaders in the carbon credit trading industry. The goal is to create a handbook that helps these executives fight global warming in the digital age. The research was conducted in three phases: in the first part, we used the Delphi method to establish expert opinion, then we developed the model through a focus group discussion, and finally, the handbook was evaluated by the specialists.

2.1 Research Design and Key Informants

We used the Delphi method and a focus group discussion to create the model and check that it was correct. The 19 experts from the industrial carbon credit market represented universities, government agencies, state enterprises, and public and private companies. This sample size satisfies the criterion set out in [12], where a panel of 17 or more experts is shown to substantially reduce the margin of error in research findings. The experts were also organized into three specialist groups, as follows: (1) five specialists to check that the questionnaire was correct and valid using the IOC; (2) fifteen specialists for the focus group discussion; and (3) five specialists to check that the handbook is suitable.

2.2 Data Collection Procedure

We collected the data following the step-by-step Delphi method, then conducted the focus group discussion, and finished with the handbook evaluation. Each stage used different tools and methods to make sure that the data were accurate, valid, and agreed upon by the experts.

2.2.1 Delphi Technique

The Delphi process was conducted in three rounds. In the first round, we had in-depth interviews with the 19 experts, in which we asked for their opinions on the key skills needed for leaders in the industrial carbon credit market. We looked at the replies to identify the main ideas and themes. We used the ideas and themes to build the first version of the model using the POCCC framework in conjunction with the 4M and KSA frameworks. In the second round, we made a five-point Likert-scale questionnaire using a combination of the ideas and

returned it to the same panel of experts. The data obtained from them were analyzed using the median and IQR; these measurements are correct for this type of rating scale data, where assumptions of normality cannot be confirmed; items were kept if they had a median value of 3.50 or above and if the answers were closely grouped with an IQR not exceeding 1.50. In the last round, the revised questionnaire was sent back to the experts to confirm that they all agreed on it. Then, the parts were ranked based on their middle value (median) and spread (IQR) in the draft of the model.

2.2.2 Focus Group Discussion

The draft model that resulted from the Delphi process was presented to the focus group with the 15 experts drawn from academia, government agencies, and the public and private sectors. The experts looked at each of the five main components and their smaller parts and agreed on changes to improve the model. Then, the discussion group checked that the model worked well, was useful, and complete, and the final model was used to create the skills handbook.

2.3 Data Analysis

We analyzed the data from the first round of the Delphi process and the group discussion by their content; this involved organizing the data, making categories, and finding the key themes based on the POCCC, 4M, and KSA frameworks. Meanwhile, for the questionnaires in the second and third rounds, we used the median score to identify the average answer and the IQR to see how much the experts agreed with each other. The criteria for item retention and agreement confirmation were as follows:

Criterion 1: the median score had to be 3.50 or higher (indicating a "high" to "highest" level of importance),

Criterion 2: the IQR had to be 1.50 or lower (indicating an acceptable degree of expert consensus).

We kept items that met both criteria and ordered them from the highest median value to the lowest. If two items had the same median, the one with the lower IQR was ranked higher. Five experts checked the handbook to see if it was correct. They used a scale of 1 to 5 to rate it, and then compared their scores to standard goals.

3 Research Findings

It was found that the Managerial Competency Model for Industrial Carbon Credit Trading Business

Executives to Mitigate the Impacts of Global Warming in the Digital Era comprises 5 main components and 25 sub-parts, as follows.

Main Component 1: Planning consists of five sub-parts: P1) Planning in alignment with policies, strategic direction, and organizational vision; P2) Knowledge, skills, and competency in planning; P3) Resource planning and operational planning; P4) Financial planning, marketing planning, and risk analysis; and P5) Utilization of digital technology and data in the planning process.

Main Component 2: Organizing consists of five sub-parts: O1) Knowledge, skills, and attributes in organizational management; O2) Organizational administration and human resource development; O3) Application of digital technology in organizational management; O4) Structural and systemic organization; and O5) Resource management and work process management within the organization.

Main Component 3: Commanding consists of five sub-parts: CM1) Strategic leadership and vision; CM2) Leadership skills and attributes that are impactful and exemplary; CM3) Directive leadership and internal organizational management; CM4) Personnel development under effective leadership; and CM5) Utilization of digital technology to support command functions.

Main Component 4: Coordinating consists of five sub-parts: CO1) Development and cultivation of collaborative networks; CO2) Systematic coordination and application of digital technology; CO3) Policy-level coordination and linkage with government agencies; CO4) Knowledge, skills, and attributes in coordination; and CO5) Shared resource and information utilization to facilitate coordination.

Main Component 5: Controlling consists of five sub-parts: CT1) Governance mechanisms and transparency in control; CT2) Sustainable resource use and cost control; CT3) Strategic monitoring and control systems; CT4) Knowledge, skills, and attributes in operational control; and CT5) Utilization of digital technology for control, auditing, and performance evaluation.

The experts all agreed that the data were consistent and that all the parts were "high" to "highest" in quality. A summary of the sub-part level results from Delphi Rounds 2 and 3 is presented in Table 1 (Appendix). The group discussion confirmed that the skills model works well and is useful for training leaders in the carbon credit trading sector.

The resulting managerial competency model is illustrated in Figure 2.

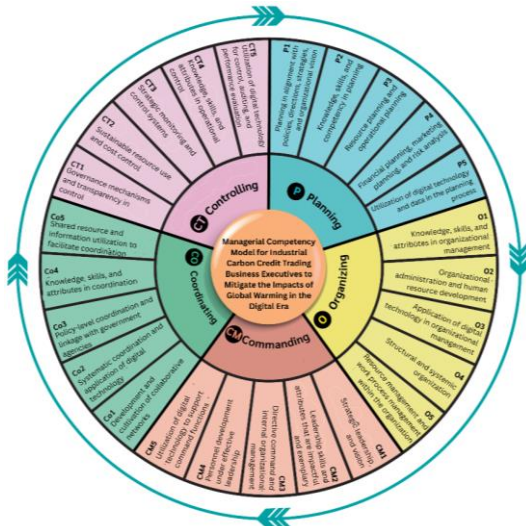


Fig. 2: POCCC framework
Source: created by the authors

The Managerial Competency Model for Industrial Carbon Credit Trading Business Executives to Mitigate the Impacts of Global Warming in the Digital Era. The model is structured around five main components of the POCCC framework (Planning, Organizing, Commanding, Coordinating, and Controlling), each encompassing five sub-parts and 25 minor parts, represented as an integrated circular framework to reflect the interdependence of the five dimensions in executive practice.

3.1 Development of the Competency Guideline Handbook

The competency development handbook for industrial carbon credit trading business executives consists of two parts: Part 1 covering the rationale and objectives of the handbook, and Part 2 presenting the developmental guidelines. The core content of the 5 main components and 25 sub-parts serves as the structural framework, organized into a developmental pathway entitled "The Circle of CARBON CREDIT," comprising 12 learning pathways. A summary of these pathways and their alignment with the model's sub-components is presented in Table 2 (Appendix).

The handbook was unanimously approved by all five specialists, who affirmed its appropriateness and applicability to the development of executives in the industrial carbon credit trading business. The resulting competency development guidelines are presented in Figure 3.

The figure presents the visual framework of "The Circle of CARBON CREDIT," in which each letter of the acronym corresponds to one or more of the 25 sub-parts of the model. The 12 developmental

pathways are arranged in a circle to show that building executive skills is an ongoing, connected process that happens across all five POCCC areas.

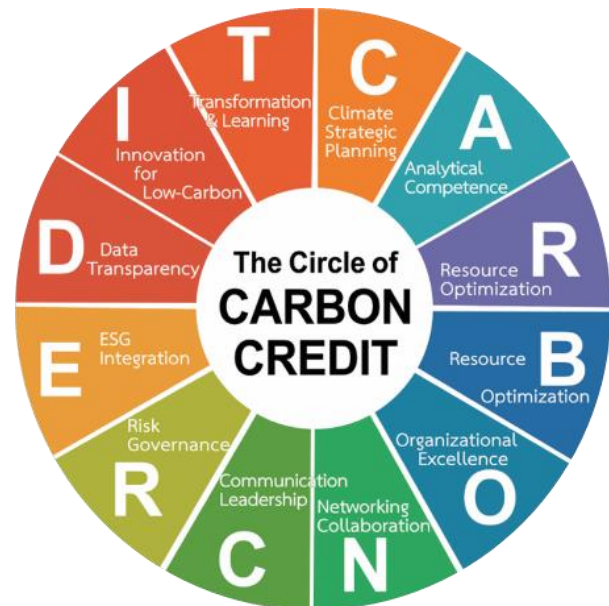


Fig. 3: The Competency Development Guidelines for Industrial Carbon Credit Trading Business Executives to Mitigate the Impacts of Global Warming in the Digital Era
Source: created by the authors

4 Discussion

In this study, we created a new, detailed model for managerial skills based on the POCCC framework. All 5 main areas — planning, organizing, commanding, coordinating, and controlling — were broken down into 25 sub-parts and 125 minor parts. The choice of POCCC as the organizing structure was deliberate because, in the first round of the Delphi process, the experts were consistent in specifically describing their work in terms of the five skills. This bottom-up approach fits naturally with the classical framework [9] and produced a model structure that practitioners found easy to grasp and apply.

4.1 Planning Component (P)

The experts were emphatic during the Delphi process that planning was the most important component, and they gave their reasons for this. Most of the companies in Thailand's T-VER program do not have a plan for managing carbon credits. They treat carbon activities as work additional to their existing business rather than as a separate business strategy, and their leaders need additional skills in setting goals, organizational vision, planning for resources and finance, marketing, and risk management. Many

of the experts repeatedly said that collecting and analyzing data is a major problem. This is because inconsistent emissions data make it difficult to rely on credit claims when they are checked. These findings are based on theory about business strategy to get people moving forward together [13], a framework for translating strategic intent into measurable outcomes [14], and evidence that digital analytics improves the quality of decisions in business planning [15].

4.2 Organizing Component (O)

Another point that was raised often in the Delphi process was that most Thai carbon credit companies lack a specific team to manage carbon emissions. Because various departments might be involved in handling carbon emissions, coordination is difficult, and there is inconsistent data on measurement. This component therefore covers competency in designing structures that give carbon management a clear institutional home, developing personnel with the technical skills to run digital measurement, reporting, and verification (MRV) systems, and managing work processes to reduce duplication in the reporting cycle. The present findings are consistent with the argument that digital organizing builds competitive capability [16] and with process management theory on reducing organizational redundancy [17].

4.3 Commanding Component (CM)

The commanding component produced one of the more specific findings from the Delphi process. Private sector informants in Round 1 pointed out that the credibility of carbon credit claims under T-VER depends significantly on the personal conduct of senior executives because the system relies on self-reported data with third-party verification. If an executive sets an organizational culture of approximate reporting, that culture tends to result in his team submitting inconsistent data. Being a role model and honesty, consequently, were ranked near the top of the commanding sub-parts by the median score. Experts who were from technology-oriented firms had a different emphasis: leaders who use live digital dashboards and act on AI-generated data are more successful in the volatile carbon markets. Leadership studies suggest that both points of view are valid [18], and evidence indicates show that companies where executives have strong digital leadership skills have an advantage over other companies [19].

4.4 Coordinating Component (CO)

The coordinating component highlights the necessity of working together. Government agencies, public

and private companies, and academic institutions should connect and use digital tools to share information and resources. This finding is consistent with the idea of collaborative governance, which helps in managing difficult policy problems in a better way [20].

4.5 Controlling Component (CT)

The experts continually said the same thing during this study: the credibility of industrial carbon credits depends on being able to prove to external auditors and buyers that their data are accurate and can be traced. This is not only a technical matter; it is a governance one, because the quality of the data reflects the culture that the leaders have established. The tools of management include rules, planning, and technology in the form of sensors, AI, and dashboards. These make it easy to track and verify everything. These findings match concepts about sustainable management [21] and evidence that digital audit tools improve the accuracy and credibility of performance reporting [22].

These five components reflect a theme that ran consistently through all three rounds of the Delphi process: that if companies are to be successful in Thailand's developing carbon credit market, they cannot delay building their skills one at a time. Instead, their leaders, the internal departments, and digital tools must all improve together at the same time. The POCCC framework is already familiar to Thai executives from their training; this new version specifically updates the framework to make it fit for carbon credits, while at the same time taking into account modern technology and laws.

5 Conclusion

Our study created a new skills model intended for use by managers in the industrial carbon credit business that will help in the fight against global warming in the digital age. We have called it the Managerial Competency Model for Industrial Carbon Credit Trading Business Executives to Mitigate the Impacts of Global Warming in the Digital Era. The model uses the POCCC framework as its basis and has 5 main components, which are divided into 25 sub-parts and a further 125 minor parts.

The model was developed using the Delphi method, and industry experts confirmed that it was good in a focus group discussion. We should point out that there is a gap between Thailand's carbon goals and what companies can actually do at present. The model's focus is on digital MRV tracking and better management, which is what the experts across

all three Delphi rounds identified as the most important areas for executive development. It should also be noted that the "Circle of CARBON CREDIT" handbook draws on the dissertation research of the first author and has not appeared in any previously published conference proceedings or journal articles. The model will help government agencies, particularly the TGO and the relevant ministries, to create rules and training programs for leaders in the carbon sector. For companies now in or planning to enter the T-VER program, the 12 developmental pathways in the handbook show a clear guide for internal training. Based on the data from the study, executives should concentrate on improving rules and digital skills first, since these are the areas where current practice shows the most evident gaps. This would have the most direct effect on the reliability and market value of a company's carbon credits.

Acknowledgement:

This dissertation was successfully completed through the invaluable guidance of three dissertation advisors: (1) Professor Dr. Suchart Siengchin, Principal Advisor; (2) Professor Dr. Teravuti Boonyasopon, Co-Advisor; and (3) Dr. Preeda Attavinijtrakarn, Co-Advisor. Sincere appreciation is also extended to all faculty members of the Doctor of Business Administration program, all government and private sector executives, specialists, academics, and qualified experts who generously contributed to this research. The dissertation researcher further expresses profound gratitude to family members and doctoral cohort colleagues (X-DBR 17) for their encouragement and assistance throughout the dissertation journey.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process The authors wrote, reviewed and edited the content as needed and they have not utilised artificial intelligence (AI) tools. The authors take full responsibility for the content of the publication.

References:

- [1] Intergovernmental Panel on Climate Change, Climate Change 2021: The Physical Science Basis, Cambridge University Press, 2021, <https://doi.org/10.1017/9781009157896>.
- [2] Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report, Core Writing Team, R. K. Pachauri and L. A. Meyer (eds.), IPCC, Geneva, Switzerland, 151 pp., ISBN: 978-92-9169-143-2, 2014.
- [3] World Wide Fund for Nature, Climate Change Impacts, 2021, [Online]. <https://www.worldwildlife.org> (Accessed Date: March 12, 2025).
- [4] National Aeronautics and Space Administration, Global Surface Temperature, NASA Global Climate Change: Vital Signs of the Planet, 2024, [Online]. <https://climate.nasa.gov/vital-signs/global-temperature/> (Accessed Date: March 12, 2025).
- [5] Department of Meteorology of Thailand, Weather and Climate Change in Thailand, 2021, [Online]. <https://www.tmd.go.th> (Accessed Date: March 12, 2025).
- [6] UNFCCC, The Paris Agreement, UNFCCC, Paris, France, 2015 (adopted); 2021 (publication), [Online]. https://unfccc.int/sites/default/files/resource/parisagreement_publication.pdf (Accessed Date: March 12, 2025).
- [7] World Bank, State and Trends of Carbon Pricing 2022, Washington, DC: World Bank, 2022. <https://doi.org/10.1596/978-1-4648-1895-0>.
- [8] Thailand Greenhouse Gas Management Organization, Procedures for Carbon Credit Trading (T-VER), 2025, [Online], <https://tver.tgo.or.th> (Accessed Date: March 12, 2025).
- [9] H. Fayol, General and Industrial Management (C. Storrs, Trans.), Pitman Publishing, 1949.
- [10] K. Ishikawa, What Is Total Quality Control? The Japanese Way, Prentice-Hall, 1985.
- [11] D. C. McClelland, Testing for competence rather than for "intelligence," American Psychologist, Vol. 28, No. 1, 1973, pp. 1–14. <https://doi.org/10.1037/h0034092>.
- [12] T. T. Macmillan, The Delphi Technique, Papers presented at the Annual Meeting of the California Junior Colleges Associations Committee on Research and Development, Monterey, CA, 1971.
- [13] M. E. Porter, What is strategy? Harvard Business Review, Vol. 74, No. 6, 1996, pp. 61–78.
- [14] R. S. Kaplan and D. P. Norton, The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment, Harvard Business School Press, 2001. ISBN: 978-1-57851-250-8.
- [15] E. Brynjolfsson and A. McAfee, The Second Machine Age: Work, Progress, and

Prosperity in a Time of Brilliant Technologies, W. W. Norton & Company, 2014. ISBN: 978-0-393-08947-9.

- [16] A. Bharadwaj, O. A. El Sawy, P. A. Pavlou, and N. Venkatraman, Digital business strategy: Toward a next generation of insights, *MIS Quarterly*, Vol. 37, No. 2, 2013, pp. 471–482.
<https://doi.org/10.25300/MISQ/2013/37:2.3>.
- [17] M. Hammer and S. Stanton, How process enterprises really work, *Harvard Business Review*, Vol. 77, No. 6, 1999, pp. 108–118.
- [18] P. G. Northouse, *Leadership: Theory and Practice*, 9th ed., SAGE Publications, 2022. ISBN: 978-1-5443-9756-6.
- [19] G. C. Kane, A. N. Phillips, J. Copulsky, and G. R. Andrus, *The Technology Fallacy: How People Are the Real Key to Digital Transformation*, MIT Press, Cambridge, MA, 280 pp., ISBN: 978-0-262-03958-8, 2019.
- [20] C. Ansell and A. Gash, Collaborative governance in theory and practice, *Journal of Public Administration Research and Theory*, Vol. 18, No. 4, 2008, pp. 543–571.
<https://doi.org/10.1093/jopart/mum032>.
- [21] J. Elkington, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, Capstone, 1997. ISBN: 978-1-900961-27-1.
- [22] KPMG, *Digital Audit: Transforming the Future of Audit*, KPMG International, Amstelveen, Netherlands, 2021, [Online].
<https://kpmg.com/xx/en/home/services/audit/digital-audit.html> (Accessed Date: March 12, 2025).

Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

Sanon Boonmee carried out the research design, data collection, and analysis and was responsible for the overall manuscript preparation. Suchart Siengchin provided principal academic supervision and reviewed the manuscript at all stages. Preeda Attavinijtrakarn contributed to instrument development and qualitative data validation. Teravuti Boonyasopon contributed to conceptual framework development and manuscript revision.

Sources of Funding for Research Presented in a Scientific Article or Scientific Article Itself

No funding was received for conducting this study.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

Creative Commons Attribution License 4.0 (Attribution 4.0 International, CC BY 4.0)

This article is published under the terms of the Creative Commons Attribution License 4.0.
https://creativecommons.org/licenses/by/4.0/deed.en_US

APPENDIX

Table 1. Summary of Expert Consensus on the 25 Sub-Parts of the Managerial Competency Model (Delphi Rounds 2 and 3, N = 19)

Main Component	Sub-Part	Items	Mdn	IQR	Importance Level
Planning (P)	P1: Planning aligned with policies, strategic direction, and organizational vision	5	5.00	1.00	Highest
	P2: Knowledge, skills, and competency in planning	5	5.00	1.00	Highest
	P3: Resource planning and operational planning	5	5.00	1.00	Highest
	P4: Financial planning, marketing planning, and risk analysis	5	5.00	1.00	Highest
	P5: Utilization of digital technology and data in planning	5	5.00	1.00	Highest
Organizing (O)	O1: Structural and systemic organization	5	5.00	1.00	Highest
	O2: Organizational administration and human resource development	5	5.00	1.00	Highest
	O3: Application of digital technology in organizational management	5	5.00	1.00	Highest
	O4: Knowledge, skills, and attributes in organizational management	5	5.00	1.00	Highest
	O5: Resource management and work process management	5	5.00	1.00	Highest
Commanding (CM)	CM1: Strategic leadership and vision	5	5.00	0.50	Highest
	CM2: Leadership skills and exemplary attributes	5	5.00	1.00	Highest
	CM3: Directive leadership and internal organizational management	5	5.00	1.00	Highest
	CM4: Personnel development under effective leadership	5	5.00	1.00	Highest
	CM5: Utilization of digital technology to support command functions	5	5.00	1.00	Highest
Coordinating (CO)	CO1: Development and cultivation of collaborative networks	5	5.00	1.00	Highest
	CO2: Systematic coordination and application of digital technology	5	5.00	1.00	Highest
	CO3: Policy-level coordination with government agencies	5	5.00	1.00	Highest
	CO4: Knowledge, skills, and attributes in coordination	5	5.00	1.00	Highest
	CO5: Shared resource and information utilization	5	5.00	1.00	Highest
Controlling (CT)	CT1: Governance mechanisms and transparency in control	5	5.00	1.00	Highest
	CT2: Sustainable resource use and cost control	5	5.00	1.00	Highest
	CT3: Strategic monitoring and control systems	5	5.00	1.00	Highest
	CT4: Knowledge, skills, and attributes in operational control	5	5.00	1.00	Highest
	CT5: Digital technology for control, auditing, and evaluation	5	5.00	1.00	Highest

Note: Mdn = Median; IQR = Interquartile Range. Importance levels: Highest = Mdn 4.50 and above; High = Mdn 3.50-4.49.

Source: created by the authors

Table 2. The 12 Learning Pathways of "The Circle of CARBON CREDIT" and Their Alignment with Model Sub-Parts

No.	Pathway Title	Aligned Sub-Parts	Developmental Focus
1	C - Climate Strategic Planning	P1, P4	Strategic planning aligned with climate policy and financial risk management
2	A - Analytical Competence	P2, CT4	Data-driven decision-making and performance measurement skills
3	R - Resource Optimization	P3, O5, CT2	Efficient allocation of human, financial, and environmental resources
4	B - Business Digitalization	P5, O3, CM5, CT5	Digital MRV systems, AI/IoT integration, and platform-based management
5	O - Organizational Excellence	O1, O2, O4	Structural design, HR development, and organizational capability
6	N - Networking Collaboration	CO1, CO3, CO4, CO5	Cross-sector partnerships and policy-level coordination
7	C - Communication Leadership	CM1, CM2, CM3	Strategic leadership, exemplary conduct, and directive effectiveness
8	R - Risk Governance	P4, CT1, CT3	Governance mechanisms and risk-based monitoring systems
9	E - ESG Integration	O2, CT1, P1	Embedding ESG principles in organizational culture and planning
10	D - Data Transparency	CT1, CT5	Auditable reporting and transparent digital control systems
11	I - Innovation for Low-Carbon	P5, O3, CO2	Technology-driven innovation for carbon reduction
12	T - Transformation and Learning	CM4, O2, P2	Continuous learning, personnel development, and adaptive leadership

Source: created by the authors