Guest editorial

Performance measurement and management: theory and practice in the energy sector

Decarbonisation is the major challenge of today's energy sector. Adopting renewable energy is one of the means for achieving lower carbon footprint. Renewables made up 17.1% of electricity generation in 2018, with hydro, wind and biomass making up the majority. That is expected to rise to 24% by 2030. Additionally, most appropriate balance among energy equity, energy security and environmental sustainability helps energy industry to achieve overall sustainability performance (Sun *et al.*, 2020).

Energy and resource efficiency, waste management using reduce, reuse and recycle principles following circular economy philosophy have been increasingly adopted in industries including energy sector for achieving "Net Zero" and business sustainability (Dey *et al.*, 2019a). However, for the successful implementation of circular economy, there is a need of appropriate analytical framework to reveal current state of practices and performances to achieve the desired decarbonization targets (Malesios and Dey, 2021).

Performance measurement and management has evolved as a philosophy to suggest improvement measures for any organization/system through thorough diagnostic studies. A performance measurement and management system is a balanced and dynamic system that enables support of decision-making processes by gathering, elaborating and analysing information (Bourne *et al.*, 2002). The concept of "balance" refers to the need for using different measures and perspectives that tied together give a holistic view of the organization (Kaplan and Norton, 1996). Moreover, various methods have been evolved, which analyse the causal relationships of performance measures and facilitate to reveal objective means for improvement.

Therefore, to address issues and challenges of energy sector for achieving appropriate balance among equity, security and sustainability in strategic, planning and operational levels, the most appropriate performance measurement frameworks need to be developed aligned with the specific organisation's strategic intents. Prior researches have introduced several methods using multiple criteria decision-making techniques that use data envelopment analysis (DEA), the analytic hierarchy process, the analytic network process, fuzzy theory, etc. (Wright *et al.*, 2013; De *et al.*, 2020; Dey and Cheffi, 2013; Malesios *et al.*, 2018). Additionally, statistical approaches such as structural equation modelling are also popular for analysing causal relationship of constructs for performance measurement (Dey *et al.*, 2019b, 2020).

This special issue through six state-of-the-art research articles demonstrates performance measurement and management aspects of energy sector. The appended paragraphs brief on the papers.

The article entitled "Application of a robust data envelopment analysis model for performance evaluation of electricity distribution companies" authored by Fallahi *et al.* (2021) evaluates using DEA the efficiency and productivity change of 39 electricity distribution companies in Iran over the period 2005–2014. This enables policymakers and practitioners at the power industry in the country and at the corporate level to make decisions effectively by comparing the efficiency and productivity changes among electricity distribution companies.

Siebert *et al.* (2021) in their article entitled "Predicting customer satisfaction for distribution companies using machine learning" aim to support electricity distribution companies on measuring and predicting customer satisfaction. The study reveals that

combined intelligent algorithm and understanding customer satisfaction improve performance with time.

Sánchez-Ortiz *et al.* (2021) demonstrate that the overcapacity and the tariff deficit negatively affect the efficiency of the distribution firms of the Spanish electricity sector. This study develops a model using DEA that shows how the efficiency problems associated with electricity distribution companies such as productive overcapacity or tariff deficit can be measured.

In their article entitled "Analyzing Enablers and Barriers to Successfully Project Control System Implementation in Petroleum and Chemical Projects", Jawad and Ledwith (2021) reveal that different project stakeholders with a better understanding of the factors improve project control system (PCS) outcomes and help project owners and contractors to evaluate the PCS from both of their perspectives. The authors have adopted Interpretative structured modelling approach and identify a number of enablers and barriers for successfully implementing PCS for project success.

Liu *et al.* (2021) in their article entitled "Assessing the Regional Sustainability Performance in China Using the Global Malmquist-Luenberger Productivity Index" investigate the situation and evolution of sustainability performance in China. The study reveals correlations of several low carbon initiatives with sustainability performances.

The article entitled "An Econometric Analysis of Electricity Consumption in Real Sectors in Nigeria" authored by Chitedze *et al.* (2021) identifies energy dependent sectors of the economy for appropriate sector-specific policy interventions, to avoid energy conservation policies that may retard the growth of the real sector and economic growth. The research further reveals that electricity consumption displays a little and insignificant impact on manufacturing sector output, as well as agriculture and service outputs. The study recommends adequate power supply to the manufacturing sector, while energy efficiency policy and regulatory reform should address agriculture and service sectors.

Six papers of this special issue contribute to both theory development in the area of performance measurement and management for the energy industry with the consideration of equity, security and sustainability and practically enable improving sustainability performance through addressing issues and challenges of the sector with the involvement of the concerned stakeholders. The expected outcomes will be useful for, practitioners, academics and policymakers.

Walid Cheffi
Zayed University, Dubai, United Arab Emirates
Chrisovaladis Malesios
Department of Rural Development, Democritus University of Thrace,
Xanthi, Greece, and
Prasanta Kumar Dey
Aston Business School, Aston University, Birmingham, UK

References

Bourne, M., Neely, A., Platts, K. and Mills, J. (2002), "The success and failure of performance measurement initiatives: perceptions of participating managers", *International Journal of Operations and Production Management*, Vol. 22 No. 11, pp. 1288-1310.

De, D., Chowdhury, S., Dey, P.K. and Ghosh, S.K. (2020), "Impact of lean and sustainability oriented innovation on sustainability performance of small and medium sized enterprises: a data

envelopment analysis-based framework", *International Journal of Production Economics*, Vol. 219, pp. 416-430.

Dey, P.K. and Cheffi, W. (2013), "Green supply chain performance measurement framework using multiple criteria decision-making approach", *Production Planning and Control*, Vol. 24 Nos 8/9, pp. 702-720.

Dey, P.K., Malesios, C., De, D., Chowdhury, S. and Abdelaziz, F.B. (2019a), "Could lean practices and process innovation enhance supply chain sustainability of small and medium sized enterprises?", *Business Strategy and the Environment*, Vol. 28 No. 4, pp. 582-598.

Dey, P.K., Yang, G., De, D., Malesios, C., Abdelaziz, F.B. and Chowdhury, S. (2019b), "Performance management of supply chain sustainability in small and medium-sized enterprises using a combined structural equation modelling and data envelopment analysis", *Computational Economics*, doi: 10.1007/s10614-019-09948-1.

Dey, P.K., Malesios, C., Abdelaziz, F.B., Chowdhury, S. and De, D. (2020), "The impact of lean management practices and sustainable oriented innovation on sustainability performance of small and medium sized enterprises: empirical evidence from the UK", *British Journal of Management*, Vol. 31 No. 1, pp. 141-161.

Kaplan, R.S. and Norton, D.P. (1996), "Using the balanced scorecard as a strategic management system", *Harvard Business Review*, Jan – Feb.

Malesios, C. and Dey, P.K. (2021), "Sustainability performance analysis of small and medium sized enterprises: variables and methods", *Socio-Economic Planning Sciences*, Vol. 75, p. 100993.

Malesios, C., Skouloudis, A., Dey, P.K., Abdelaziz, F.B., Kantartzis, A. and Evangelinos, K. (2018), "Impact of small- and medium-sized enterprises sustainability practices and performance on economic growth from a managerial perspective: some modelling considerations and empirical analysis results", *Business Strategy and the Environment*, Vol. 27 No. 7, pp. 960-972.

Sun, H., Mohsin, M., Alharthi, M. and Abbas, Q. (2020), "Measuring environmental sustainability performance of South Asia", *Journal of Cleaner Production*, Vol. 251, p. 119519.

Wright, D., Dey, P.K. and Brammer, J. (2013), "A fuzzy levelised energy cost method for renewable energy technology assessment", *Energy Policy*, Vol. 62, pp. 315-323.

723