REFERENCES

Afcha, S., & López, G. L. (2014). Public funding of R&D and its effect on the composition of business R&D expenditure. *BRQ Business Research Quarterly*, *17*(1), 22–30.

Andereggen, S., Zoller, F. A., & Boutellier, R. (2013). Sharing research equipment to bridge intraorganizational boundaries. *Research-Technology Management*, 56(1), 49–57.

Andrade, J. S., & Duarte, A. P. (2016). Crowding-in and crowding-out effects of public investments in the Portuguese economy. *International Review of Applied Economics*, 30(4), 488–506.

Azar, S. A. (2007). Measuring the US social discount rate. *Applied Financial Economics Letters*, 3(1), 63–66.

Ballini, R., Mendonça, A. R. R., & Gomide, F. (2009). Evolving fuzzy modelling in risk analysis. *Intelligent Systems in Accounting, Finance and Management*, 16(1–2), 71–86.

Becker, B. (2015). Public R&D policies and private R&D investment: A survey of the empirical evidence. *Journal of Economic Surveys*, 29(5), 855–1010.

Biswas, R. K., Kabir, E., & Rafi, R. B. R. (2019). Investment in research and development compared to military expenditure: Is research worthwhile? *Defence and Peace Economics*, 30(7), 846–857.

Bolger, D., & Houlding, B. (2016). Reliability updating in linear opinion pooling for multiple decision makers. *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, 230(3), 309–322.

Bosch-Sijtsema, P. M., & Postma, T. J. B. M. (2009). Cooperative innovation projects: Capabilities and governance mechanisms. *Journal of Product Innovation Management*, 26(1), 58–70.

Bozeman, B., & Rogers, J. (2001). Strategic management of governmentsponsored R&D portfolios. *Environment and Planning C: Politics and Space*, 19(3), 413–442.

Brahim, M. B., & Abdelaziz, F. B. (2019). Multilevel, multiplayer R&D investment decisions: Cooperation or competition? *Journal of Multi-Criteria Decision Analysis*, 26(5–6), 329–340.

Broekel, T., Brachert, M., Duschl, M., & Brenner, T. (2015). Joint R&D subsidies, related variety, and regional innovation. *International Regional Science Review*, 40(3), 297–326.

Bruijn, H., & Porter, A. L. (2007). The education of a technology policy analyst – to process management. *Technology Analysis & Strategic Management*, 16(2), 261–274.

Bruin, W. B., Parker, A. M., & Fischhoff, B. (2020). Decision-making competence: More than intelligence? *Current Directions in Psychological Science*, 29(2), 186–192.

Bursic, K. M., & Cleland, D. I. (1991). Strategic technology management. *Engineering Management Journal*, 3(2), 21–29.

Burtonshaw-Gunn, S. A. (2012). Project management, the essential management toolbox: Tools, models and notes for managers and consultants. Chichester: Wiley.

Carlo, L. D. (2006). Public decision processes, creativity, and psychoanalysis. *Public Decision Processes, Creativity, and Psychoanalysis,* 36(1), 44–62.

Chandrasekaran, A., Linderman, K., Sting, F. J., & Benner, M. J. (2016). Managing R&D project shifts in high-tech organizations: A multi-method study. *Production and Operations Management*, 25(3), 390–416.

Cheung, M. T., Greenfield, P. F., & Liao, Z. (2009). Selecting R&D projects for technology-based innovation: Knowledge management in the face of embarras de choix. *Journal of General Management*, *35*(2), 61–80.

Chou, J. S., Peng, M., Persad, K. R., & O'Connor, J. T. (2006). Quantitybased approach to preliminary cost estimates for highway projects. *Transportation Research Record: Journal of the Transportation Research Board*, 1946(1), 22–30.

Clark, N. G., & O'Donnell, A. T. (1986). Project analysis and science policymaking in underdeveloped countries. *Project Appraisal*, 1(1), 43–50. Cook, T. J., & Rizzuto, R. J. (1989). Capital budgeting practices for R&D: A survey and analysis of business week's R&D scoreboard. *The Engineering Economist*, 34(4), 291–304.

Danziger, J. N. (1991). Intergovernmental structure and fiscal management strategies: A crossnational analysis. *Governance*, 4(2), 168–183.

Darko, A., Chan, A. P. C., Ameyaw, E. E., Owusu, E. K., Pärn, E., & Edwards, D. J. (2019). Review of application of analytic hierarchy process (AHP) in construction. *International Journal of Construction Management*, *19*(5), 436–452.

Dasgupta, M., Gupta, R. K., & Sahay, A. (2011). Linking technological innovation, technology strategy and organizational factors: A review. *Global Business Review*, 12(2), 257–277.

Dey, P. K. (2012). Integrated approach to project feasibility analysis: A case study. *Impact Assessment and Project Appraisal*, 19(3), 235–245.

Dunk, A. S., & Kilgore, A. (2004). Financial factors in R&D budget setting: The impact of interfunctional market coordination, strategic alliances, and the nature of competition. *Accounting and Finance*, 44(2), 123–138.

Elias, A. A., Cavana, R. Y., & Jackson, L. S. (2002). Stakeholder analysis for R&D project management. *R&D Management*, 32(4), 301–310.

Erenburg, S. J. (1993). The real effects of public investment on private investment. *Applied Economics*, 25(6), 831–837.

Erken, H., & Kleijn, M. (2010). Location factors of international R&D activities: An econometric approach. *Economics of Innovation and New Technology*, 19(3), 203–232.

EUREKA Secretariat. (2005). 20th Anniversary report: Two decades of support for European innovation. Belgium: The EUREKA Secretariat.

Evans, D. (2004). A social discount rate for France. *Applied Economics Letters*, 11(13), 803–808.

Evans, D., & Sezer, H. (2002). A time preference measure of the social discount rate for the UK. *Applied Economics*, 34(15), 1925–1934.

Filippetti, A., & Peyrache, A. (2015). Labour productivity and technology gap in European regions: A conditional frontier approach. *Regional Studies*, 49(4), 532–554.

Flaig, J. J. (2005). Improving project selection using expected net present value analysis. *Quality Engineering*, 17(4), 535–538.

Geva-May, I., & Pal, L. A. (1999). Good fences make good neighbours: Policy evaluation and policy analysis - exploring the differences. *Evaluation*, *5*(3), 259–277.

Ginn, M. E., & Rubenstein, A. H. (1986). The R&D/production interface: A case study of new product commercialization. *Journal of Product Innovation Management*, 3(3), 145–218.

Groso, A., Ouedraogo, A., & Meyer, T. (2012). Risk analysis in research environment. *Journal of Risk Research*, 15(2), 187–208.

Guellec, D., & Van Pottelsberghe De La Potterie, B. (2010). The impact of public R&D expenditure on business R&D. *Economics of Innovation and New Technology*, 12(3), 225–243.

Guglielmi, M., Lascar, S., Mastrocola, V., & Williams, E. (2006). Evaluating R&D with "first bounce–last bounce" framework. *Research-Technology Management*, 49(1), 44–50.

Gumus, E., & Celikay, F. (2015). R&D expenditure and economic growth: New empirical evidence. *Margin: The Journal of Applied Economic Research*, 9(3), 205–217.

Haapanen, M., Lenihan, H., & Mariani, M. (2014). Government policy failure in public support for research and development. *Policy Studies*, 35(6), 557–575.

Haavaldsen, T., Lædre, O., Volden, G. H., & Lohne, J. (2014). On the concept of sustainability – assessing the sustainability of large public infrastructure investment projects. *International Journal of Sustainable Engineering*, 7(1), 2–12.

Hahn, E. D. (2003). Decision making with uncertain judgments: A stochastic formulation of the analytic hierarchy process. *Decision Sciences*, *34*(3), 443–466.

Hartmann, G. C., Myers, M. B., & Rosenbloom, R. S. (2006). Planning your firm's R&D investment. *Research-Technology Management*, 49(2), 25–36.

Herath, H. S. B., & Park, C. S. (1999). Economic analysis of R&D projects: An options approach. *The Engineering Economist*, 44(1), 1–35.

Herfert, K. F., & Arbige, M. V. (2015). Aligning an R&D portfolio with corporate strategy. *Research-Technology Management*, *51*(5), 39–46.

Herrmann, J. W. (2017). Rational decision making. In *Wiley StatsRef: Statistics reference online*. Hoboken, NJ: Wiley.

Hodges, R. L. (1983). Avoiding fiscal management problems in human service agencies. *Administration in Social Work*, 6(4), 61–67.

Howlett, M. (2015). Policy analytical capacity: The supply and demand for policy analysis in government. *Policy and Society*, 34(3–4), 173–182.

Howlett, M., & Newman, J. (2010). Policy analysis and policy work in federal systems: Policy advice and its contribution to evidence-based policy-making in multi-level governance systems. *Policy and Society*, 29(2), 123–136.

Hsu, Y. G., Tzeng, G. H., & Shyu, J. Z. (2003). Fuzzy multiple criteria selection of government-sponsored frontier technology R&D projects. *R*&D *Management*, 33(5), 539–551.

Hu, J. L., Yang, C. H., & Chen, C. P. (2011). R&D efficiency and the national innovation system: An international comparison using the distance function approach. *Bulletin of Economic Research*, 66(1), 55–71.

Huang, X. X., Newnes, L. B., & Parry, G. C. (2012). The adaptation of product cost estimation techniques to estimate the cost of service. *International Journal of Computer Integrated Manufacturing*, 25(4–5), 417–431.

Ishizaka, A., Tasiou, M., & Martínez, L. (2020). Analytic hierarchy processfuzzy sorting: An analytic hierarchy process–based method for fuzzy classification in sorting problems. *Journal of the Operational Research Society*, 71(6), 928–947.

Jain, V. K. (1977). Some aspects of cost control in large R & D projects. *IETE Journal of Research*, 23(1), 32–35.

Kolisch, R., Meyer, K., & Mohr, R. (2005). Maximizing R&D portfolio value. *Research-Technology Management*, 48(3), 33–39.

Kopczewska, K. (2016). Efficiency of regional public investment: An NPV-based spatial econometric approach. *Spatial Economic Analysis*, 11(4), 413–431.

Korea Development Institute (KDI). (2017). Annual report of KDI public investment management center. Ministry of Strategy and Finance (MOSF).

Kuchta, D., & Skowron, D. (2016). Classification of R&D projects and selection of R&D project management concept. *R&D Management*, 46(5), 831–841.

Kul' bovskaia, N. (1984). The social and economic effect of new technology. *Problems in Economics*, 26(10), 68–83.

Lauto, G., & Valentin, F. (2013). How large-scale research facilities connect to global research. *Review of Policy Research*, 30(4), 381–408.

Lee, D. A., Hogue, M. R., & Gallagher, M. A. (1997). Determining a budget profile from a R&D cost estimate. *The Journal of Cost Analysis*, 14(2), 29–41.

Leyden, D. P., & Link, A. N. (1991). Why are governmental R&D and private R&D complements? *Applied Economics*, 23(10), 1673–1681.

Link, A. N., & Scott, J. T. (2013). Market failure and public support of R&D. In *Bending the arc of innovation: Public support of R&D in small, entrepreneurial firms*. New York, NY: Springer.

Lopez, D. M. (2007). Linking public investment to private investment. The case of Spanish regions. *International Review of Applied Economics*, 20(4), 411–423.

Lorca, P., & Andrés, J. (2018). The importance of cultural factors in R&D intensity. *Cross-Cultural Research*, 53(5), 483–507.

Mackenzie, A. (2015). The production of prediction: What does machine learning want? *European Journal of Cultural Studies*, 18(4–5), 429–445.

Mackey, W. F. (1996). Conducting a technology management assessment. *INCOSE International Symposium*, 6(1), 150–159.

Madrick, J. (2007). Demand-led growth, government intervention, and public investment: Broadening the policy choices for America. *Challenge*, *50*(6), *51*–90.

Maroto, A., Gallego, J., & Rubalcaba, L. (2016). Publicly funded R&D for public sector performance and efficiency: Evidence from Europe. *R&D Management*, 46(S2), 564–578.

Marzouk, M., Amer, O., & El-Said, M. (2013). Feasibility study of industrial projects using Simos' procedure. *Journal of Civil Engineering and Management*, 19(1), 59–68.

McCleskey, S. (2012). When free markets fail: Saving the market when it can't save itself. Hoboken, NJ: Wiley.

Milkovich, G. (1993). Costs and benefits. Hospital Practice, 28(1), 39-43.

Moyson, S. (2017). Cognition and policy change: The consistency of policy learning in the advocacy coalition framework. *Policy and Society*, *36*(2), 320–344.

National Research Council. (1999). *Advanced technology program: Challenges and opportunities*. Washington, DC: The National Academies Press.

Naveh, E. (2007). Formality and discretion in successful R&D projects. *Journal of Operations Management*, 25(1), 110–125.

Nomaler, Ö., & Verspagen, B. (2008). Knowledge flows, patent citations and the impact of science on technology. *Economic Systems Research*, 20(4), 339–366.

Østbye, S. E., & Roelofs, M. R. (2013). The competition-innovation debate: Is R&D cooperation the answer? *Economics of Innovation and New Technology*, 22(2), 153–176.

Patten, S., Mitton, C., & Donaldson, C. (2005). From the trenches: Views from decision-makers on health services priority setting. *Health Services Management Research*, *18*(2), 100–108.

Percoco, M. (2008). A social discount rate for Italy. *Applied Economics Letters*, 15(1), 73–77.

Perrot, R., Mosaka, D., Nokaneng, L., & Sikhondze, R. (2013). Government R&D impact on the South African macroeconomy. *African Journal of Science, Technology, Innovation and Development*, 5(6), 531–540.

Petroni, G., Venturini, K., & Verbano, C. (2012). Open innovation and new issues in R&D organization and personnel management. *The International Journal of Human Resource Management*, 23(1), 147–173.

Phillips, S. A. M., & Yeung, H. W. (2003). A place for R&D? The Singapore science park. *Urban Studies*, 40(4), 707–732.

Pillai, A. S., & Rao, K. S. (1996). Performance monitoring in R&D projects. *R&D Management*, 26(1), 57–65.

Price, C., & Nair, C. T. S. (1985). Social discounting and the distribution of project benefits. *The Journal of Development Studies*, 21(4), 525–532.

Qin, R., Grasman, S. E., Long, S., Lin, Y., & Thomas, M. (2012). A framework of cost-effectiveness analysis for alternative energy strategies. *Engineering Management Journal*, 24(4), 18–35.

Rabiela, R. G., & Corral, M. J. S. (2004). R&D centres in Mexico in an open economy: Redefining operating practices. *Industry and Higher Education*, 18(3), 167–176.

Rabinovitz, F. F. (1989). The role of negotiation in planning, management, and policy analysis. *Journal of Planning Education and Research*, 8(2), 87–95.

Rabinowitz, J. (1992). Collective decision-making: The analytic hierarchy process. Social Policy & Administration, 26(1), 87–97.

Radaelli, C. M., & Dente, B. (1996). Evaluation strategies and analysis of the policy process. *Evaluation*, 2(1), 51–66.

Radin, B. A. (2016). Policy analysis and advising decisionmakers: Don't forget the decisionmaker/client. *Journal of Comparative Policy Analysis: Research and Practice*, 18(3), 290–301.

Reyck, B. D., & Leus, R. (2008). R&D project scheduling when activities may fail. *IIE Transactions*, 40(4), 367–384.

Rider, G., Milkovich, S., Stool, D., Wiseman, T., Doran, C., & Chen, X. (2000). Quantitative risk analysis. *Injury Control and Safety Promotion*, 7(2), 115–133.

Rosiawan, M., Singgih, M. L., & Widodo, E. (2019). Model of quality costs and economic benefits of a business process of manufacturing companies. *Cogent Engineering*, 6(1), 1–15.

Rudolph, T., Wagner, T., & Fawcett, S. (2008). Project management in retailing: Integrating the behavioral dimension. *International Review of Retail Distribution & Consumer Research*, 18(3), 325–341.

Rush, C., & Roy, R. (2001). Expert judgement in cost estimating: Modelling the reasoning process. *Concurrent Engineering*, 9(4), 271–284.

Saaty, T. L. (2005). Analytic hierarchy process. In *Encyclopedia of biostatistics*. Chichester: Wiley.

Sanchez, A. M. (1989). R&D project selection strategy: An empirical study in Spain. R&D Management, 19(1), 63-68.

Schumann, P. A., Derek, L., Ransley, D. L., & Prestwood, D. C. L. (1995). Measuring R&D performance. *Research-Technology Management*, 38(3), 45–54.

Serrador, P., & Turner, R. (2015). The relationship between project success and project efficiency. *Project Management Journal*, 46(1), 30–39.

Sharma, S. K., & Chanda, U. (2017). Developing a Bayesian belief network model for prediction of R&D project success. *Journal of Management Analytics*, 4(3), 321–344.

Sharon, A., Weck, O. L., & Dori, D. (2009). Is there a complete project plan? A model-based project planning approach. *INCOSE International Symposium*, *19*(1), 96–109.

Shiferaw, A. T., & Klakegg, O. J. (2012). Linking policies to projects: The key to identifying the right public investment projects. *Project Management Journal*, 43(4), 14–26.

Siems, T. F. (2015). Risk analysis. In *Wiley encyclopedia of management*. Chichester: Wiley.

Souder, W. E., Maher, P. M., Shumway, C. R., Baker, N. R., & Rubenstein, A. H. (1973). Methodology for increasing the adoption of R & D project selection models. *R&D Management*, 4(1), 75–83.

Strassheim, H. (2019). Behavioural mechanisms and public policy design: Preventing failures in behavioural public policy. *Public Policy and Administration*. doi:10.1177/0952076719827062

Swaney, J. A. (1995). Social economics and risk analysis. *Review of Social Economy*, 53(4), 575–594.

Swedlow, B. (2002). Toward cultural analysis in policy analysis: Picking up where Aaron Wildavsky left off. *Journal of Comparative Policy Analysis: Research and Practice*, 4(3), 267–285.

Taracena, F. L. (2006). An economic analysis for product and process design. *Quality Engineering*, 18(1), 33–37.

Thamhain, H. J. (2014). Defining the project. In *Managing technology-based* projects. Hoboken, NJ: Wiley.

Thamhain, H. J. (2015). Assessing the effectiveness of quantitative and qualitative methods for R&D project proposal evaluations. *Engineering Management Journal*, 26(3), 3–12.

Tolga, A. Ç., & Kahraman, C. (2008). Fuzzy multiattribute evaluation of R&D projects using a real options valuation model. *International Journal of Intelligent Systems*, 23(11), 1153–1176.

Tsao, C. T. (2010). The expectation-deviation net present value by fuzzy arithmetic for capital investments. *Journal of Statistics and Management Systems*, 13(2), 267–281.

Tüysüz, F., & Kahraman, C. (2006). Project risk evaluation using a fuzzy analytic hierarchy process: An application to information technology projects. *International Journal of Intelligent Systems*, 21(6), 559–584.

Verma, D., Mishra, A., & Sinha, K. K. (2011). The development and application of a process model for R&D project management in a high tech firm: A field study. *Journal of Operations Management*, 29(5), 462–476.

Veselý, A. (2020). Policy formulation redesigned: A new understanding of policy design and its implications for instruction. *Teaching Public Administration*, 38(3), 213–232.

Vining, A. R., & Boardman, A. E. (2006). Metachoice in policy analysis. Journal of Comparative Policy Analysis: Research and Practice, 8(1), 77–87.

Wang, J. (2017). Structuring innovation funnels for R&D projects under uncertainty. *R&D Management*, 47(1), 127–140.

Weimer, D. L. (2012). The universal and the particular in policy analysis and training. *Journal of Comparative Policy Analysis: Research and Practice*, 14(1), 1–8.

Weisbrod, G., & Duncan, C. (2016). Integrating multiple economic analysis methods for more effective decision making: Three-dimensional framework. Transportation Research Record: Journal of the Transportation Research Board, 2597(1), 99–107.

Wiewel, W. (1995). Response: The use of economic analysis in public policy. *Economic Development Quarterly*, 9(4), 324–326.

Wu, H., Thomas, A. M., & Wright, S. (2020). Using the R&D capitalisation choice to explain the scale benefits of R&D investment. *Australian Journal of Management*, 45(4), 579–606.

Yeh, R. H., & Lin, Y. F. (2012). Optimal pricing policies for services with consideration of facility maintenance costs. *International Journal of Systems Science*, 43(6), 1123–1132.