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Associate Professor
Dept. of Industrial and Information Systems Engineering
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EDUCATION

Ph.D. in Industrial Engineering (2012)

- University of Illinois at Urbana-Champaign, USA
- Dissertation title: *Green Profit Design for Lifecycle*
- Advisor: Harrison M. Kim

M.S. in Industrial Engineering (2007)

- Seoul National University, Korea
- Thesis title: *An Eco-Architecture Based Approach for Supporting Design for Disassembly*
- Advisor: Y.S. Hong

B.S. in Industrial Engineering (2005)

- Seoul National University, Korea
- Cum Laude

High School Diploma (2001)

- Jinmyeong Girls' High School, Korea

RESEARCH INTERESTS

- Design for Green Profit
- Design for Circular Economy, Remanufacturing Optimization
- Data-Driven Design, Data Analytics for Sustainability
- Life Cycle Assessment (LCA)
- Service Science
- Design for Environmental, Social and Governance (ESG)
- Design for Sustainable Behaviour
- Design for Sharing Economy and Collaborative Consumption
- Neuro Design and Marketing for Sustainability

PROFESSIONAL EXPERIENCE

Associate Professor (2019–Present)

- Dept. of Industrial and Information Systems Engineering
- Soongsil University, Korea

Assistant Professor (2013–2019)

- Dept. of Industrial and Information Systems Engineering
- Soongsil University, Korea

Post-Doctoral Researcher (2012–2013)

- Dept. of Industrial and Enterprise Systems Engineering
- University of Illinois at Urbana-Champaign, USA

Post-Master Researcher (2007–2008)

- Engineering Research Institute
- Seoul National University, Korea

HONORS and AWARDS

Research Honors

- Best Paper Award, International Conference on Innovative Computing, Information and Control (ICICIC2015)
- Reviewers' Choice Award, International Conference on Engineering Design (ICED 2013)
- Best Thesis Award in Manufacturing and Logistics Fields (1st Place), Korean Institute of Industrial Engineers (2007)
- Best Thesis Award, Dept. of Industrial Engineering, Seoul National University (2007)

Teaching Honors

- Best Teaching Award – Soongsil University (2021)
- Best Course Portfolio Award (1st Place) – Soongsil University (2020)
- Best Course Portfolio Award (1st Place) – Soongsil University (2018)
- Teaching Change Essay Competition Award (1st Place) – Soongsil University (2018)
- '3S Teaching Method' Research Award (1st Place) – Soongsil University (2016)
- Best Teaching SFP (Soongsil Fellowship Professor) Award – Soongsil University (2015)
- Best Teaching Award – Soongsil University (2015)
- Best Course Portfolio Award (2nd Place) – Soongsil University (2013)

Public Service Honors

- Associate Editor, Journal of the Korea Society for Simulation (한국시뮬레이션학회논문지)
- Scientific Committee Member, ICED conference (2017, 2019, 2021)
- Committee Member, ICICIC conference (2021)
- Session Chair for the ICICIC conference (2015, 2017), ISIKM conference (2020)
- Referee of *J. Clean. Prod.*, *J. Mech. Des.*, *Int. J. Prod. Res.*, *Comput. Ind. Eng.*, *Int. J. Precis. Eng. Manuf.* - *Green Technol.*, *J. Manuf. Syst.*, *Sustainability*, *Designs*, etc.

RESEARCH FUNDING and EXPERIENCE

- Design for the Sharing Economy: Optimal Sustainable Design of Sharing-Oriented Products Using Design Analytics (공유경제형 제품의 지속가능 디자인 방법론 연구: 디자인 애널리틱스를 활용한 설계 최적화 모델 개발)
Funded by *National Research Foundation of Korea* (2019–2022); Role: PI
- Developing Sustainable Closed-Loop Products and Services: Integrated Approach to Optimal Product Design and Remanufacturing (지속가능한 자원순환형 제품·서비스 상품의 최적설계를 위한 제품-재제조 통합 최적화 방법론)
Funded by *National Research Foundation of Korea* (2016–2019); Role: PI
- LCA-Driven, Sustainable Product Portfolio Design
Funded by *University of Illinois at Urbana-Champaign* (2013); Role: PI
- Trend-Mining Design - Foundations for Modeling the Mutual Influence between Pre-Life Design and End-of-Life Recovery of a Sustainable Product Portfolio
Funded by *National Science Foundation of USA* (2010–2012); Role: Participant
- Life Cycle Assessment (LCA) of heavy-duty equipment
Funded by *Deere and Company* (2010–2012); Role: Participant
- Enterprise Systems for Product Portfolio Design
Funded by *National Science Foundation, USA* (2008–2010); Co-worked with PC Rebuilders & Recyclers Inc.; Role: Participant
- Sustainable product development based on mass customization and product platform (제품 플랫폼과 대량맞춤화 기반 지속가능 제품개발)
Funded by *Korea Research Foundation* (2007–2008); Role: PI
- Expanded product-platform concepts for successful mass customization and sustainable product development (제품 플랫폼 개념의 확장을 통한 대량맞춤화 및 지속가능 제품개발 방법론)
Funded by *Korea Research Foundation* (2006–2007); Role: Participant
- Development of an eco-architecture for sustainable product development in auto industries (자동차 산업의 지속가능성 구현을 위한 에코 아키텍처의 개발 및 적용)
Funded by *Korea Research Foundation* (2005–2006); Co-worked with *Hyundai Motor Company*; Role: Participant

PUBLICATIONS (BOOK and BOOK CHAPTERS)

- Kwak, M. and Kim, H. M., 2013, "Product Family Design and Recovery for Lifecycle," In Simpson, T., Jiao, R., Siddique, Z. and Holttta-Otto, K. (Eds.), *Advances in Product Family and Product Platform Design*, Springer.
- Ulrich, K.T. and Eppinger, S.D., 2017, "Product Design and Development (제품 개발 프로세스: 신제품 개발을 위한 시스템적 접근법, 6th ed.)", Hong, Y.S., Kang, C., and Kwak, M. (Trans.), McGraw Hill Education.

PUBLICATIONS (JOURNAL ARTICLES)

1. Lee, S., Park, S. and Kwak, M., 2021, "Importance-Kano (I-Kano) Analysis: A Review-Mining Approach for Attribute Characterization and Prioritization," *Under Review*.
2. Kwak, M., 2021, "Monte Carlo Simulation of the Effect of Heterogeneous Too Cheap Prices on the Average Price Preference for Remanufactured Products," *Sustainability*, 13(17).
3. Kim, S. and Kwak, M., 2021, "Review-Based Control Charts for Service Quality Monitoring: A Brief Review and Future Directions," *ICIC Express Letters, Part B: Applications*, 12(8).
4. Lee, S. and Kwak, M., 2020, "Consumer valuation of remanufactured products: a comparative Study of product categories and business models," *Sustainability*, 12(18).
5. Kim, S. and Kwak, M., 2020, "The economics of cell phone remanufacturing: differences by product line, model age, and end-of-life quality," *ICIC Express Letters, Part B: Applications*, 11(9), pp. 831–838.
6. Park, S., Kwak, M. and Choi, J., 2020, "Comparing competitive advantages of hotel services using opinion mining of online customer reviews: A study focusing on 5-star hotels in Seoul, Korea," *ICIC Express Letters, Part B: Applications*, 11(8), pp. 743–749.
7. Park, G. and Kwak, M., 2020, "The life cycle of online smartphone reviews: investigating dynamic change in customer opinion using sentiment analysis," *ICIC Express Letters, Part B: Applications*, 11(5), pp. 509–516.
8. Kwak, M., Choi, J. and Park, S., 2019, "Sentiment analysis of online reviews for evaluating customer satisfaction on hotel service attributes," *Journal of Tourism Management Research*, 23(4), pp. 1–25.
9. Kwak, M., 2018, "Optimal line design of new and remanufactured products: a model for maximum profit and market share with environmental consideration," *Sustainability*, 10(11).
10. Choi, J., Park, S., Kim, S., Lee, G. and Kwak, M., 2018, "Key attributes of hotel service quality in Korea: an analysis based on online review mining," *Journal of Tourism Management Research*, 22(5), pp. 1069–1093.
11. Lee, S. and Kwak, M., 2018, "A review of the research on remanufacturing using the citation network analysis," *ICIC Express Letters*, 12(4), pp. 345–351.

12. Choi, G. B., Lee, H. H., Oh, S. A., Kwak, M., Kim, S. and Lee, S., 2018, "Effect of mobile apps on environmental impact of smartphones," *ICIC Express Letters, Part B: Applications*, 9(2), pp. 137–144.
13. Kwak, M. and Kim, H. M., 2017, "Green profit maximization through integrated pricing and production planning for a line of new and remanufactured products," *Journal of Cleaner Production*, 142(4), pp. 3454–3470.
14. Kwak, M. and Kim, H. M., 2016, "Modeling the time-varying advantages of a remanufactured product: is “reman” better than “brand new”?," *Journal of Mechanical Design*, 138(5).
15. Yoo, N., Kwak, M., and Kang, C., 2016, "How product attributes affect consumer judgments of preference and distinctiveness: attribute importance and individual diversity," *ICIC Express Letters, Part B: Applications*, 7(6), pp. 1255–1260.
16. Kwak, M., 2016, "Integrated pricing and production planning for remanufacturing," *ICIC Express Letters, Part B: Applications*, 7(6), pp. 1365–1370.
17. Kim, S., Kwak, M. and Lim, T., 2016, "Buying, renting, or sharing a car: an economic assessment by consumer type, with an application to the Korean automotive market," *ICIC Express Letters, Part B: Applications*, 7(5), pp. 1031-1035.
18. Kwak, M., 2016, "Assessing the greenness of product lifetime extension," *ICIC Express Letters, Part B: Applications*, 7(2), pp. 491–496.
19. Kwak, M. and Kim, H. M., 2015, "Design for life-cycle profit with simultaneous consideration of initial manufacturing and end-of-life remanufacturing," *Engineering Optimization*, 47(1), pp.18–35.
20. Kwak, M., 2015, "Planning demand-and legislation-driven remanufacturing for a product family: a model for maximizing economic and environmental potential," *Industrial Engineering & Management Systems*, 14(2), pp. 159–174.
21. Kwak, M., Kang, C., Park, M., Shin, D. and Choi, H., 2015, "Building a library of consumer product LCA for enhancing sustainable consumer behavior," *ICIC Express Letters, Part B: Applications*, 6(3), pp. 763–769.
22. Ma, J., Kwak, M. and Kim, H. M., 2014, "Demand trend mining for predictive life cycle design," *Journal of Cleaner Production*, 68, pp. 189–199.
23. Kwak, M. and Kim, H. M., 2013, "Market positioning of remanufactured products with optimal planning for part upgrades," *Journal of Mechanical Design*, 135(1).
24. Kwak, M., Kim, H. M. and Thurston, D., 2012, "Formulating second-hand market value as a function of product specifications, age, and conditions," *Journal of Mechanical Design*, 134(3).
25. Kwak, M. and Kim, H. M., 2011, "Assessing product family design from an end-of-life perspective," *Engineering Optimization*, 43(3), pp. 233–255.
26. Kwak, M., Behdad, S., Zhao, Y., Kim, H. M. and Thurston, D., 2011, "E-waste stream analysis and design implications," *Journal of Mechanical Design*, 133(10).
27. Kwak, M. and Kim, H. M., 2010, "Evaluating end-of-life recovery profit by a simultaneous consideration of product design and recovery network design," *Journal of Mechanical Design*, 132(7).
28. Behdad, S., Kwak, M., Kim, H. M. and Thurston, D., 2010, "Simultaneous selective

disassembly and end-of-life decision making for multiple products," *Journal of Mechanical Design*, 132(4).

29. Kang, C. M., Kwak, M. J., Cho, N.W., and Hong, Y. S., 2009, "Automatic derivation of transition matrix for end-of-life decision making," *International Journal of Production Research*, 48(11), pp. 3269–3298.
30. Kwak, M. J., Hong, Y.S. and Cho, N.W., 2009, "Eco-architecture analysis for end-of-life decision making," *International Journal of Production Research*, 47(22), pp. 6233–6259.
31. Kwak, M. J., Lee, H. B., Hong, Y. S., Cho, N. W., and Choi, K. Y., 2008, "The eco-architecture for optimal end-of-life strategy for complex products: an extension to hierarchical analysis," *Journal of the Korean Institute of Industrial Engineers*, 34(1), pp.79–89.

MEMBERSHIP and OTHER INFORMATION

- Member of the Korean Institute of Industrial Engineers (대한산업공학회)
- Member of the Korea Society for Simulation (한국시뮬레이션학회)
- ABEEK Program Director of the Dept. of Industrial and Information Systems Engineering, Soongsil University (2018–2019)
- Admission Officer of Soongsil University (2016, 2018)