

Wisdom Manufacturing in the Context of Holonic (HM), Bionic (BM) and Fractal Manufacturing (FM)

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Abstract

In this paper we give a brief review of holonic, bionic and fractal manufacturing. We discuss role of wisdom manufacturing in each of these. We finally conclude that Wisdom Manufacturing will take more time to evolve in firms with differentiation strategy and hence in holonic manufacturing (compared to firms with cost leader strategy and hence in Bionic Manufacturing).

Keywords

Wisdom Manufacturing, Holonic Manufacturing, Bionic Manufacturing and Fractal Manufacturing.

References

- Yao, X., Zhou, J., Lin, Y., Li, Y., Yu, H. and Liu, Y., 'Smart manufacturing based on cyber-physical systems and beyond', *Journal of Intelligent Manufacturing*, 2017.
- Xifan Yao, 'Towards a wisdom manufacturing vision' *International Journal of Computer Integrated Manufacturing* · October 2014.
- Xifan Yao & Yingzi Lin, 'Emerging manufacturing paradigm shifts for the incoming industrial revolution', *Sensors*, MDPI Dec 2015.
- Cunji Zhang, Xifan Yao and Jianming Zhang, 'Abnormal Condition Monitoring of Workpieces Based on RFID for Wisdom Manufacturing Workshops', *Int J Adv Manuf Technol*, DOI 10.1007/s00170-015-8076-0, Nov 2015.
- Paulo Leitão and Francisco Restivo, 'A Framework for Distributed Manufacturing Applications', available on internet.
- Mella Piero and Regina Frei, José Barata, 'THE HOLONIC PERSPECTIVE IN ORGANIZATION AND MANAGEMENT', available on internet.
- Evolvable Production Systems Context and Implications, available on internet.
- RADU F. BABI CEANU and F. FRANK CHEN, 'Development and applications of holonic manufacturing systems: a survey', *Journal of Intelligent Manufacturing*, 17, 2006, p. 111-131.
- Nuno Silva, Carlos Ramos, 'PROPOSAL FOR INTER-ENTERPRISES NEGOTIATION INFRA-STRUCTURES USING AN HOLONIC APPROACH', available on internet (Research Gate).
- C Zhang and X Yao, 'Innovation in Wisdom Manufacturing Cunji Zhang School of Mechanical and Automotive Engineering', 2016 Online International Conference on Green Engineering and Technologies (IC-GET).
- Peter T. Ward and G. Keong Leong, 'Configurations of Manufacturing Strategy, Business Strategy, Environment and Structure', available on internet.
- Paulo L, 'Agent-based distributed manufacturing control: A state-of-the-art survey', *Engineering Applications of Artificial Intelligence*, 22 (2009), p. 979-991.
- Camilo Christo and Carlos Cardeira, 'Trends in Intelligent Manufacturing Systems', available on internet.
- Miles and Snow et al., 'Organization strategy, structure and process', *Academy of management Review*, July 1978, p. 546-562.
- Competitive Advantage, Michael E. Porter, The Free Press, 1985

Competitive Strategy : Techniques for analyzing industries & competitors, Michael E. Porter, 1980. The Free Press.
Atanu Mondal, RRK Sharma and Niraj V, “Linking organizational strategies to multiagent system typologies”,
International J of Innovation and Technology Management; V 7 (3); 2016; pp. 106-110.

Biographies

RRK Sharma He is B.E. (mechanical engineering) from VNIT Nagpur India, and PhD in management from I.I.M., Ahmedabad, INDIA. He has nearly three years of experience in automotive companies in India (Tata Motors and TVS-Suzuki). He has 32 years of teaching and research experience at the Department of Industrial and Management Engineering, I.I.T., Kanpur, 208016 INDIA. To date he has written 1176 papers (peer-reviewed (376) /under review (24) / working papers 776 (not referred)). He has developed over ten software products. To date, he has guided 62 M TECH and 21 Ph D theses at I.I.T. Kanpur. He has been Sanjay Mittal Chair Professor at IIT KANPUR (15.09.2015 to 14.09.2018) and is currently a H.A.G. scale professor at I.I.T. Kanpur. In 2015, he received “Membership Award” given by IABE USA (International Academy of Business and Economics). In 2016 he received the “Distinguished Educator Award” from IEOM (Industrial Engineering and Operations Management) Society, U.S.A. In 2019 and 2020, he was invited by the Ministry of Human Resources Department, India, to participate in the NIRF rankings survey for management schools in India. In 2019, he was invited to participate in the Q.S. ranking exercise for ranking management schools in South Asia.

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