

PENGGUNAAN SIMULASI ARENA UNTUK MENINGKATKAN PRESTASI PERKHIDMATAN DOBI

(Application of Arena Simulation to Improve the Performance of Laundry Services)

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ABSTRAK

Dewasa ini, perkhidmatan dobi semakin mendapat sambutan. Walau bagaimanapun, pengurusan yang lemah akan menyebabkan perkhidmatan menjadi kurang cekap. Tambahan pula, usahawan perniagaan kecil sering menghadapi masalah dari segi kewangan untuk melakukan penambahbaikan dalam perniagaan mereka. Oleh itu dalam penyelidikan ini, sistem simulasi untuk membantu dalam meningkatkan prestasi perkhidmatan dobi telah dicadangkan. Tumpuan adalah kepada operasi kedai dobi tradisional yang melibatkan proses mengambil tempahan, mencuci, mengering, melipat dan menyeterika. Kajian ini dilakukan menggunakan teknik simulasi yang merupakan satu kaedah penyelesaian masalah yang menganalisis telatah sistem dan kesan cadangan “bagaimana-jika” ke atas sistem sebenar. Keseluruhan sistem pengoperasian ini digambarkan dengan model simulasi bagi membolehkan sistem sebenar dikaji dan dianalisis. Pengumpulan data telah dilakukan melalui pencerapan dan temu bual di tempat kajian. Perisian Arena digunakan untuk merangka, membangunkan dan melaksanakan model simulasi. Bagi mendapat gambaran yang lebih jelas mengenai operasi kedai dobi ini, animasi model simulasi turut dibangunkan. Seterusnya, hasil keputusan dianalisis bagi mengenal pasti sebarang masalah yang wujud dan mencadangkan penambahbaikan. Analisis hasil larian model simulasi asal dirumuskan mengikut beberapa atribut seperti purata tempoh masa menunggu, purata tempoh perkhidmatan, purata tempoh masa keseluruhan, jumlah tempahan yang keluar dan masuk untuk setiap proses; dan perancangan penggunaan tenaga kerja bagi setiap sumber. Tiga buah model simulasi penambahbaikan kemudiannya dicadangkan bagi mengatasi masalah yang dikenal pasti. Analisis ke atas hasil kajian menunjukkan model simulasi penambahbaikan 1 (MP1) merupakan model simulasi penambahbaikan terbaik. Model simulasi ini melibatkan tambahan sebuah mesin basuh dan mengurangkan masa proses menyeterika dan proses melipat masing-masing kepada 4 minit dan 1.5 minit untuk setiap helai pakaian. Model alternatif ini mampu mengurangkan masalah dalam sistem pengoperasian kedai dobi dan seterusnya meningkatkan prestasi keseluruhan perkhidmatan dobi.

Kata kunci: simulasi Arena; perkhidmatan dobi; tradisional; penambahbaikan; prestasi

ABSTRACT

Laundry service has become more popular nowadays. However, poor management will lead to inefficient services. Moreover, another obstacle that is often faced by small entrepreneurs in order to expand their business is financial problem. Therefore in this study, a simulation system is proposed to assist in improving the performance of laundry services. The focus is on the operation at a conventional laundry system which involves the process of taking orders, washing, drying, folding and ironing. This study is performed by using simulation technique which is a problem solving method which analyse the behaviour of the system and the effect of ‘what-if’ recommendations on the actual system. Simulation model depicts the entire operation of the actual system and hence enables the behaviour of the actual system to be studied and analysed. Data collection was done through on site observation and interviews. Arena software is used to create, develop and run the simulation model. To get a better picture on the operation of the laundry, the animated simulation model is also developed. The results are analysed to identify any problems and to propose further improvements. Analysis of the results from the original simulation model is based on attributes such as average waiting time, average total time, average service time, total number in and out for each process, and the scheduled utilisation of

each resource. Three improvement simulation models were proposed in order to overcome the problems identified. Analysis of the results indicates that improvement model 1 (MP1) is the best improvement model. The model involves addition of one washing machine and reducing the times for ironing and folding processes to 4 and 1.5 minutes for each cloth, respectively. This improvement model decreases the problem in the laundry operational system and hence improves the overall performance of the laundry services.

Keywords: Arena simulation; laundry service; conventional; improvement; performance

Rujukan

- Banks J. 1998. *Handbook of simulation: Principle, Methodology, Advances, Application and Practice*. Ed. ke-2. New York: John Wiley Publication.
- Banks J., Carson J.S., Nelson B.L. & Nicol D.M. 2005. *Discrete Event System Simulation*. Upper Saddle River: Pearson Prentice Hall.
- Belkadi K. & Tanguy A. 2010. Modelling and simulation of the ophthalmology service for RMUHO. *Proceedings of the 12th WSEAS International Conference on Automatic Control, Modelling & Simulation*, pp. 278-286.
- Carson II J.S. 2005. Introduction to modeling and simulation. *Proceedings of the 2005, Winter Simulation Conference*, pp. 16-23.
- Chong B., Abu Bakar S. & Liong C.-Y. 2012. Modelling of distribution system in a factory warehouse using Arena. *Journal of Quality Measurement and Analysis* 8(2): 65-76.
- Gupta N. & Williams E.J. 2004. Simulation improves service and profitability of an automobile service garage. *Proceedings 16th European Simulation Symposium*, pp. 53-59.
- Hani Y., Amodio L., Yalaoui F. & Chen H. 2008. Simulation based optimization of a train maintenance facility. *Journal of Intelligent Manufacturing* 19(3): 293-300.
- Harrell C. & Gladwin B. 2007. Productivity improvement in appliance manufacturing. *Proceedings of the 2007 Winter Simulations Conference*, pp. 1610-1614.
- Jeddi A.R., Renani N.G., Malek A. & Khademi A. 2012. A discreet event simulation in an automotive service context. *International Journal of Computer Science Issues* 9(6):142-147.
- Law A.M. & McComas M.G. 2001. How to build valid and credible simulation models. *Proceedings of the 2001 Winter Simulation Conference*, pp. 22-29.
- Marasini R. & Dawood N. 2002. Simulation modeling and optimization of stockyard layouts for precast concrete products. *Winter Simulation Conference, San Diego*, Jilid 2, pp. 1731–1736.
- Medeiros D.J., Swenson E. & DeFlitch C. 2008. Improving patient flow in a hospital emergency department. *Proceedings of the 2008 Winter Simulation Conference*, pp. 1526-1531.
- Mehmod A. & Jahanzaib M. 2010. Simulation Based Decision Support System (SBDSS) for the vehicle repair and maintenance in dynamic business environment. *Proceeding of the International Conference on Industrial Engineering and Operation Management*, pp. 1-8.
- Miller S. & Pegden D. 2000. Introduction to Manufacturing Simulation. *Proceedings of the 2000 Winter Simulation Conference*, Jilid 1, pp. 63-66.
- Pierreval H. 1997. Using evolutionary algorithms and simulation for the optimization of manufacturing systems. *IIE Transaction* 29(3): 181–190.

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