Editorial

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Owing to the increasingly globalised economy and for conforming to customer requirements, logistics has transformed from a physical distribution phase into a process that manages an efficient and effective flow, storage of goods, service, and related information from point-of-origin to point-of-consumption. In this respect, logistics outsourcing, cost management, customer service and technology involvement have become the prime impetus. Moreover, in recent years, logistics has been treated as a part of the supply chain process that involves both forward and reverse flow. With the advent of information and internet technologies, decision-making has secured a crucial position in the process of logistics planning, implementing and controlling.

This special issue is in line with two current research orientations: one is logistics engineering concerns that focus

on methods and techniques for handling logistics activities, the other one concerning logistics management issues with an emphasis on strategic process-planning and decision-making for enhancing customer satisfaction and economic efficiency. Both of these orientations require multidisciplinary integration/collaboration involving various aspects of computer knowledge and information technology. Accordingly, this special issue collects articles offering various viewpoints and showcases of computer applications in logistics engineering and management, as well as diverse problems, models and solutions for these applications.

With advances of international containerisation, global competitions become increasingly severe in terms of logistics engineering and management. In this respect, container terminals secure an extremely crucial position in the entire container supply chain. Modelling and simulation are essential tools for the design and analysis of container terminals. A computer model can emulate the activities at various levels of details and capture the essential interactions among the subsystems. Analysis based on the simulation is particularly useful for designing new terminals, making modifications to the existing terminals, and evaluating the benefits of new resources or impacts of operation policies. In the first paper, 'Capacity analysis of container terminals using simulation techniques', Huang, Hsu, Chen and Nautiyal present a proposed scalable tool that integrates all the activities of a terminal. The system incorporates methods to generate realistic vessel arrival patterns and can track the moves of millions of containers from their arrival to departure. The simulation system is applied to analyse three container terminals in Southeast Asia region, and it was found to be effective in replicating realistic operations as well as in conducting capacity evaluations.

To attain an effective workload scheduling to support the dynamic deployment of yard cranes, in the second paper, 'An investigation into dynamic yard crane deployment and comparisons between hill-climbing and best-first-search algorithms', Yan, Huang and He postulate a novel strategy for yard crane scheduling. A dynamic allocation model is initially developed using integer programming for yard cranes. To resolve the NP-hard problem regarding the yard crane deployment, two heuristic algorithms, i.e., the hill-climbing algorithm and the best-first-search algorithm, are employed. A case study on a specific container terminal yard in Shanghai is used for system illustration via a simulation approach. Consequently, comparisons are conducted based on the results obtained from the hill-climbing and best-first-search algorithms.

To develop an effective Quay Crane Scheduling Problem (QCSP) model, in the third paper, 'A decomposition-heuristic-rule-enabled decision-making system for dynamic quay crane allocation and scheduling', Zhang, Zhao and Shi investigate into a QCSP, which is decomposed into two sub-problems, i.e., the QC-allocation and QC-scheduling levels. By defining precedence constraints and heuristic rules, dynamic decisions are then made between ships and within a ship. An example of a container terminal in Shanghai is used to validate the dynamic QC allocation and scheduling strategy. It was also revealed from the experimental results that the strategy possessed such properties as automated scheming, low memory occupation and user-friendly interfacing, viz., the operation efficiency, stability and practicality outperformed the existing mode. Therefore, this approach has been proven effective and pragmatic in automated operation and decision-making.

In the next paper, 'A berth allocation strategy using heuristics algorithm and simulation optimisation', Chang, Yan, Chen and Jiang develop a novel strategy, which combines dynamic berth allocation and yard planning, to deal with the Berth Allocation Problem (BAP). A mathematical model is first established based on the quay length of a container terminal. Subsequently, heuristic algorithms are developed for simulating and optimising the dynamic berth allocation strategy with regard to yard planning. An example of a specific container terminal in Shanghai is used to illustrate the feasibility and effectiveness of the proposed approach.

Nowadays, with the advances of port enterprises, much intensive research has been gradually involved in the structural fatigue assessment and management of port logistics equipments. However, relevant work on large-scale port logistics equipments is still lacking owing to their complex structures. In addition, a single technique could not effectively deal with such complicated structures as large-scale port logistics equipments. As such, in the fifth paper, 'Structural fatigue assessment and management of large-scale port logistics equipments', Liu, Mi, and Zheng speculate a hybrid fatigue assessment method using the S–N curve and fracture mechanics methods for crack formation and propagation life estimations of structures, respectively. Based on this notion, measurements on equipment inspection and repair are also recommended. Eventually, the fatigue assessment of a real-life crane is used as an example to illustrate the practicality and efficiency of this approach.

At present, logistics is broadly accepted as an integral of supply chain. In the following paper, 'A scenario analysis of a location problem with uncertain demand', Tanonkou, Benyoucef and Xie describe the design of a distribution network composed of a single supplier serving a set of retailers through a set of Distribution Centres (DCs). In the proposed approach, it is supposed that some parameters are random and described by scenarios, each with a specified probability of occurrence. Based on this assumption, the problem is formulated as a two-stage non-linear discrete stochastic optimisation problem so as to minimise the expected total cost resulted from the DC location, transportation, working inventory and safety stocks cost. Then, a Lagrangian relaxation approach is proposed to generate efficient solutions and determine tight lower bounds. Finally, numerical results show the efficiency of the proposed method.

From a managerial viewpoint of logistical or supply networking, the competition edges have changed

tremendously towards Business Process Reengineering (BPR) starting from the early-stage of new product development (NPD). To organise NPD under a unified value-added process or network, which covers all activities of a supply chain, in the paper entitled 'A supply-chain-oriented business process reengineering strategy for on-demand new product development', Chen, Yan and Chen tackle a Business Process Reengineering System (BPRS), which consists of three modules, viz. product conceptualisation module, supply chain formation module, and BPR decision-making module. In BPRS, well-established requirements acquisition techniques general sorting and repertory grids were employed and adapted for generating an initial product platform and partner selection criteria, respectively. Based on the initial product platform, a number of initial design options were typically generated. According to each typical design option, partners were preliminarily selected in terms of cost, delivery time and competence using the Hopfield neural network. Consequently, BPR decisions were made based on a location-capacity-based strategy to finalise both product conceptualisation and supply-chain formation. A case study on cellular phone design was used for system validation.

Alternatively, product customisation is frequently promoted with the rise of individualism. However, fulfilling user's desire of creation is merely being partially responded, viz., the lack of professional knowledge and skills is found as a major barrier. In the eighth paper, 'Incorporating users' creativity in new product development via a user successive design strategy', Luh and Chang suggest that enabling users to exercise their creativity or to design the products they purchase becomes a major challenge for product designers/developers. To this end, a design process for facilitating users' successive design is introduced to help product designers develop their designs to achieve such goal. Two design cases were employed for feasibility verification of the proposed process. Therein, products developed through such procedure can enhance and enrich user's desire and experience in designing while increasing values of the product commercially and emotionally.

Further elaborated in the Human-Computer Interaction (HCI) perspective, in the last paper, 'The effect of gender-related difference on human-centred performance using a mass assessment method', Chen and Chen focus on the effect of gender-related difference on human-centred performance using a mass assessment method. In particular, the study have found that female computer users in normal usage group, i.e., using computer less than 60 hr per week, might suffer from approximately 10% slower pointing time than males since females might not satisfy with operational effort than male subjects. Furthermore, male computer users in the intensive usage group suffer 17% slower pointing time than in the normal usage group. The result suggests the need for redesigning an ordinary mouse innovatively. The authors also pointed out further improvement for the mass assessment method and Fitts' Law Generator (FLG) software and recommended the design guideline for an alternative mouse.

The guest editors thank all the authors for their submitting and revising papers for the special issue. We also wish to extend our thanks to the referees in providing their valuable comments to the papers, which are most essential for controlling the quality of this special issue. Lastly, the guest editors express their sincere appreciations to Dr. Mohammed Dorgham, the Editor in Chief, and Mr. Richard Sharp, the Journal Manager, for their advice, help and support to make the special issue come true.