Computer Aided Design Adaptation in Design and Manufacturing Process for Malaysia SME Apparel Industry: A Review

[1, 2]Zur, Rohana and [1]A.S. Syaimak
[1]Faculty of Information Science and Technology, The National University of Malaysia (UKM),
Selangor, Malaysia
[2]Faculty of Art and Design, University Technology MARA (UITM),
Shah Alam, Malaysia

Abstract: Computer Aided Design (CAD) system has been reported to be one of the most important requirement for the apparel business to be successful. It is claimed to be one of the main technology adapted by most of the large garment manufacturing countries in order to performed various task in designing and manufacturing processes. Several researchers have proposed the CAD adaptation framework in various area and purposes but limited research has focused on the Small and Medium Enterprise (SMEs) in Malaysia apparel sector. In order to fill this gap, the main objective of this study is to carry out the fundamental review of information on CAD usage among the Small and Medium Enterprise (SMEs) apparel sector in Malaysia. The survey was conducted on 343 SMEs apparel owners as respondents. The finding shows that the adaptation of CAD application among the apparel SMEs in Malaysia are still in the adjustment phase and has not been able to implement 100% deployment of CAD. This is due to several factors that will be discussed in this study and the suggestion and direction for future research are also presented.

Key words: About Computer Aided Design (CAD), SME apparel Malaysia, technology adaptation, apparel business, SMEs, presented

INTRODUCTION

The Computer-Aided Design (CAD) is one of the technology adaption that has been implemented in most of the big manufacturing industry such as automobile, electronics, information and technology and others industry globally. Generally, from the manufacturing point of view, CAD has been used as the main application in designing products, processing and managing the operations and resources of any manufacturing plant. According to Dabolina and Vilumsone (2012), a computer technology has been extensively used to help both designing and information system which focus on the effort to increase the overall efficiency and meet the customer's requirements. With the high demand from competitive market, SMEs industry need to be align with the current computer technology and comply with the demands of the customers in order to increase their productivity.

Literature review
Overview of SMEs apparel in Malaysia: Back in 1980s, Malaysia's strength in the apparel industry has established itself as a contract manufacturer of high-end global brands such as Marks and Spencer, Hills and Brooks, Guess, Tommy Hilfiger, Gap, Adidas, Nike where these experiences have led to the Malaysia clothing manufacturers emphasis on design, production and high quality of packaging. The growing of this industry is due to the rise of consumers demand on the fashion that is up to date and trendy.

According to the statistic from Malaysia's Ministry of Internal Trade And Industry (MITI) at present, SMEs account to 80% of total manufacturing establishment in Malaysia are from traditional sectors such as food and beverages, textile and apparel, basic product and metals (Hashim, 2015). In addition by year of 2012, there were about 623 SMEs apparel entrepreneur companies have been registered under the SMEs Corp Malaysia and this value has been increasing 25% every year. This apparel industry was highly concentrated in mainly in Selangor, kuala lumpur, terengganu and johor with sub-sectors in clothing, textile, undergarment, shoes, batik and uniform and mostly cater to the domestic market. Figure 1 shows the total number of SMEs apparel entrepreneur company in Malaysia based on the states. Thus, some of the large to medium Malaysian owned companies could also own

Corresponding Author: Zur, Rohana, Faculty of Information Science and Technology,
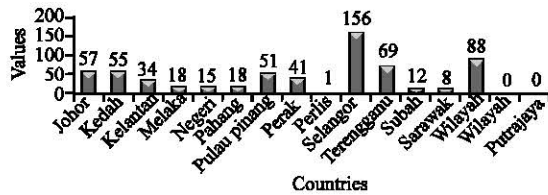The National University of Malaysia (UKM), Selangor, Malaysia

Fig. 1: Total number of apparel entrepreneur in Malaysia on the states

at numerous levels of plumb-organized suppliers and own the service niche markets such as Nike, Cartoon Network and Adidas. Small and medium enterprises are almost exclusively owned by Malaysian Chinese and tend to play an important role in supporting the larger industries, which they produce, their end products of both export and domestic markets. As for the current period, many local small and medium enterprises business owners, which are particularly Malays have become a great apparel provider for the local and neighbouring countries.

Domestically, they are very well known and some of them had succeeded in penetrating Foreign market like Thailand, Indonesia, Brunei and Singapore. By considering this situation, Malaysia can serve as a potential country to operate the apparel business for the small and medium enterprises due to the dynamic development of fashion industry's and ethnic variances compared to other developing countries in this region.

The government is concerned about the use of technology and innovation in order to enhance the productivity and developing new and improving the existing processes, services and product (Small, 2007).

MATERIALS AND METHODS

The data in this study was collected in year 2015 from SME apparel that has been registered with SME Corp Malaysia from all states of Malaysia. This study was conducted in order to achieve the main objectives of this study which are to conduct an exploratory research (Shields and Rangarjan, 2013) of the CAD user that has not been clearly defined in commodity SME apparel Malaysia. This study consists of 623 respondents from SME apparel that has been registered with SME Corp Malaysia. This study is to find to what extent the CAD is adapted in the SMEs apparel in Malaysia. In order to get the validity and reliability on finding the CAD usage in Malaysia, survey instrument which is questionnaire was selected. A set of questionnaire that contained a mixture of open and closed ended questions were used in this study. In addition, Yeung *et al.* (2010) and Moleong (2002) stated that questionnaires are a tool used to obtain

direct information from the respondents and also a form of descriptive studies. Moreover, the survey was done randomly using face to face and phone interview method. Face to face and phone interview was used in this study because it will guide and assist the respondent to fill up the survey and ensure that the respondents fully understands on how to answer the questions. The respondents were giving information about the researcher's identity and background. Purpose of the research, content of questionnaire, importance of the data for the present study as well for the researcher's and benefits that might derived from the research were also explained. Among the questions asked are the type of company, CAD usage and classification of CAD.

RESULTS AND DISSCUSION

From the total of 623 registered apparel companies in Malaysia, only 343 companies responded and agreed to participate in this study. This is due to researcher has faced some difficulties in order to obtain the data and feedback from company registered with the SMEs. However, the percentage of 64% feedback that was obtained in this study can be used in order to represent the desired variable. Based on Table 1, it shows that a total number of 177 (48 %) apparel companies used CAD.

The examples of the most popular CAD that are used by the respondents are gerber, lectra, richpeace and Tukatech. Furthermore from all of the states in Malaysia, Selangor come out with the highest number of apparel companies that used CAD technology (156 companies). Meanwhile, a total number of 166 (52 %) apparel companies in Malaysia did not used CAD in their design and manufacturing activities and again selangor shows the highest number of registered apparel company in Malaysia that not used CAD application in Malaysia. There are a large number of apparel company in Malaysia that preferred not to used CAD in their design and manufacturing activities due to certain factors such lacking in the information regarding the usage of CAD application, lack of expertise in order to handle and transfer technology of CAD application and finally is fast misunderstood information about CAD application which are not practical in design and manufacturing process (Jiau *et al.*, 1999). Table 2 shows the types of CAD that are used in the SME apparel industries in Malaysia. Based on this Table, the most frequent types of CAD used in the industry are CAD/CAM (43% user). This is supported by Dabolina and Vilumsone, (2012) which stated that CAD/CAM is the most favoured types of CAD used in the industries. Moreover, CAD with addition of CAM is one of the modern computer-aided designing software

Table 1: CAD usage in apparel SME industries in Malaysia

States	No. of company that used CAD	No. of company that not using CAD
Johor	15	15
Kedah	9	15
Kelantan	4	8
Melaka	3	7
Negeri Sembilan	2	4
Pahang	3	5
Pulau Pinang	14	12
Perak	16	6
Perlis	0	1
Selangor	67	40
Terengganu	14	20
Sabah	0	2
Sarawak	1	3
Kuala Lumpur	29	28
Total	177	166

Table 2: Types of CAD that used in the SME apparel industries in Malaysia

States	All state in Malaysia (%)
CAD	32
CAD/CAM	43
CAD embroidery	14
CAD shoes	11

that provides possibility to avoid small operations and manual research to raise precision, productivity and organize information flow (Dabolina and Vilumsone, 2012). Moreover, the usage of designing systems will excludes the time consuming manual preparation of patterns, creation of layouts and relocation of written information. Other types of CAD that are adapted in SME are CAD only which consists of 32% of usage, CAD embroider with 14% and finally CAD for shoes design 11%. From Table 2, it shows that CAD is adapted in the organization to assist the designing and manufacturing process.

CONCLUSION

As a conclusion, the usage of CAD in the apparel industries has a significant role in the creation of this finding. CAD systems allow two-dimensional (2D) and three-dimensional (3D) product illustrations and visualizations easily and precisely. Moreover, CAD can decrease the time consumption and costs necessary to design a product. The costs of a product can be calculated with the help of the product management systems based on the development parameters, the layout of patterns, textile expenditures, model complexity and specification as well as the previous experience of the company stored in a data base. In addition, modern computer-aided designing software provides a possibility to avoid manual research to raise precision, productivity and organize information flow. Nevertheless in Malaysia, the awareness of the CAD adaptation is still at the low

level for most of the SME apparel industries compared to the other apparel producing countries. From here, it is suggested in future that more studies on adapting CAD in SME apparel in Malaysia will be initiated. Future study such as research on adaptation of CAD technology in SMEs apparel using Quality Function Deployment (QFD) framework to enhance the usage of CAD and encouragement or guidelines to use CAD should be introduced. Hopefully, this study can raise the awareness to the SME Company of advantages of CAD and make them adapt the technology.

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REFERENCES

Dabolina, I. and A. Vilumsone, 2012. The role of the latest clothing cad-cam system applications in the educational process. Mater. Sci., 7: 63-68.

Hashim, J., 2015. Information Communication Technology (ICT) adoption among SME owners in Malaysia. Int. J. Bus. Inf., 2: 221-240.

Jiau, H.C., K.F. Ssu, J.M. Lin and Y.P. Ko, 1999. Reusing CAD tools in object oriented based framework. Proceedings of the 23rd Annual International Conference on Computer Software and Applications, COMPSAC'99, October 29-29, 1999, IEEE, Tainan, Taiwan, ISBN:0-7695-0368-3, pp: 357-362.

Moleong, L., 2002. Qualitative Research Methodology. Remaja Rosdakarya, Bandung, Indonesia,.

Shields, P. and N. Rangarjan, 2013. A Playbook for Research Methods: Integrating Conceptual Frameworks and Project Management. New Forums Press, Stillwater, OK, ISBN-13: 9781581072471, Pages: 210.

Small, M.H., 2007. Planning, justifying and installing advanced manufacturing technology: A managerial framework. J. Manuf. Technol. Manage., 18: 513-537.

Yeung, H.T., T.M. Choi and C.H. Chiu, 2010. Innovative Mass Customization in the Fashion Industry. In: Innovative Quick Response Programs in Logistics and Supply Chain Management, Edwin, T.C.C. and M.C. Tsan (Eds.). Springer, Berlin, Germany, ISBN:978-3-642-04312-3, pp: 423-454.