

**A STUDY ON KITCHEN SPATIAL LAYOUT OF FOOD
TRUCK IN KLANG VALLEY**

BY

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**A thesis submitted in fulfillment of the requirement for the
degree of Master of Science (Built Environment)**

**Kulliyyah of Architecture and Environmental Design
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JANUARY 2020

ABSTRACT

Food and Beverages (F&B) industries are now turning into mobile vendor, including food truck as new and promising business proposition. The strategy of setting up easy and fast food to serve from vehicles is known as food truck. However, despite the fact that food truck is adopting compact kitchen from restaurant to mobile kitchen, the food preparation in a compact space shows different concern which on space utilization and safety. This research aim to study the spatial element in the food truck kitchen's spatial focusing on Klang Valley area and to propose the design recommendation for food truck kitchen. Therefore, the objectives of this research are 1) to investigate the spatial elements in the food truck kitchen in selected area in Klang Valley 2) to propose a design recommendation for food truck kitchen. 2 phases of survey were done which are pilot survey (survey A) and main survey (survey B). 32 food trucks samples were selected based on popularity in the search engine by using term of "food truck". Data collection has been analyzed on the types of food trucks by line up analysis to categorize the type of menu served and location. The number of movements during food preparation were analyzed as well to obtain the work triangle ratio. Therefore, 8 elements have been identified as the factors that influenced the food truck kitchen layout design which are; menu on the truck ; equipment used ; food preparing behavior ; type of kitchen; work triangle; number of worker, air ventilation and type of cabinet. The result revealed that there are 3 types of menu which are fusion cuisine western cuisine and beverages. The western fusion showed the highest number of movement during food preparation. The more numbers of preparation movements shows that the preparation of the meal was more complicated. This study also found that there are food truck workspace with work triangle and without work triangle. The wider work triangle in the kitchen will give a better workspace for food preparation. Most of the food trucks samples have ideal work triangle. However, many food truck samples still having discomfort working space such as collision. Thus, this study proposed a design recommendation for food truck kitchen spatial that consist of 8 elements which are , 1) to categorized the menu, 2) to list the compulsory equipment needed for food truck kitchen, 3) to determine what is meal preparing zoning in the kitchen 4) determine the type of kitchen (there are 4 types), 5) installing mounted cabinet 6) create bigger and even work triangle based on meals preparation behavior 7) to have only 2 maximum workers at 1 shift, and 8) to install exhaust fan especially on fusion and western cuisine food truck. The research on design recommendations for the food truck kitchen spatial is hope to be considered by food truck vendors, the agencies and government to use this as a basic guideline and hopefully all activities in the food truck kitchen can be done smoothly in a safe and healthy work environment.

خلاصة البحث

تجارياً جديداً واعداءً، فمن المعروف أن إستراتيجية إعداد المواد الغذائية سهلة سريعة من خلال الشاحنات الغذائية، إذ تعتمد هذه الشاحنات دمج المطبخ داخلاً ليصير محمولاً فيها؛ يظهر شعور بالقلق من المساحة والسلامة، وعليه؛ يهدف هذا البحث إلى التحقيق في العنصر المكاني لمطبخ الشاحنة الغذائية في منطقة مختارة من وادي كلانج، واقتراح توصية لتصميمه، وقد أجريت مرحلتان من الدراسات الاستقصائية؛ تجريبية (أ)، ورئيسة (ب)، واختيرت 32 عينة من الشاحنات الغذائية على أساس الشعبية في محرك البحث باستخدام مصطلح "الشاحنة الغذائية"، وجرى تحليل البيانات من خلال التحليلات الخطية لكل من: قائمة الطعام التي تُقدّم، والموقع، وعدد الحركات في أثناء إعداد الطعام؛ لذا؛ حُدِّت ثمانية عناصر على أنها عوامل أثرت في تصميم مطبخ الشاحنة الغذائية؛ هي: قائمة الطعام، والأدوات المستخدمة، والسلوك في إعداد الطعام، ونوع المطبخ، ومثلث العمل، وعدد العمال، والتهوية، ونوع أثاث المطبخ، وكشفت النتائج أن هناك ثلاثة أنواع لقوائم الطعام هي: المطبخ المنوع، والمطبخ الغربي، والمشروبات، وأظهر المطبخ الغربي أعلى عدد من الحركات في أثناء إعداد الطعام، مما يشير إلى أن إعداد الوجبة كان أكثر تعقيداً، وأن هناك مساحة في الشاحنة الغذائية سواء كان فيها مثلث العمل أم لم يكن، وأن مثلث العمل يعطي مساحة عمل أفضل لإعداد الطعام، ومعظم العينات لديها مثلث العمل المثالي، ولكن؛ عددًا من العينات يعاني قلة الراحة في مساحة العمل؛ مثل الاصطدام، وعليه؛ اقترح البحث توصية تصميم مطبخ الشاحنة الغذائية مكونًا من ثمانية عناصر هي: تصنيف القائمة، وتحديد الأدوات اللازمة، وتوزيع إعداد الوجبات على مناطق في المطبخ، وتحديد نوع المطبخ (أربعة أنواع)، وتثبيت أثاث المطبخ المتحرك، وإنشاء مثلث عمل أكبر على أساس الوجبات وسلوك الإعداد، وأن يكون الحد الأقصى للعمال اثنين، وتثبيت مروحة العادم، ولا سيما لقائمة المطبخ الغربي، ويوصي البحث بانعني الشاحنات الغذائية والوكالات والحكومة باستخدام هذا التصميم التوجيهي الأساس، لتكون جميع النشاطات في مطبخ الشاحنة الغذائية سلسلة آمنة صحية.

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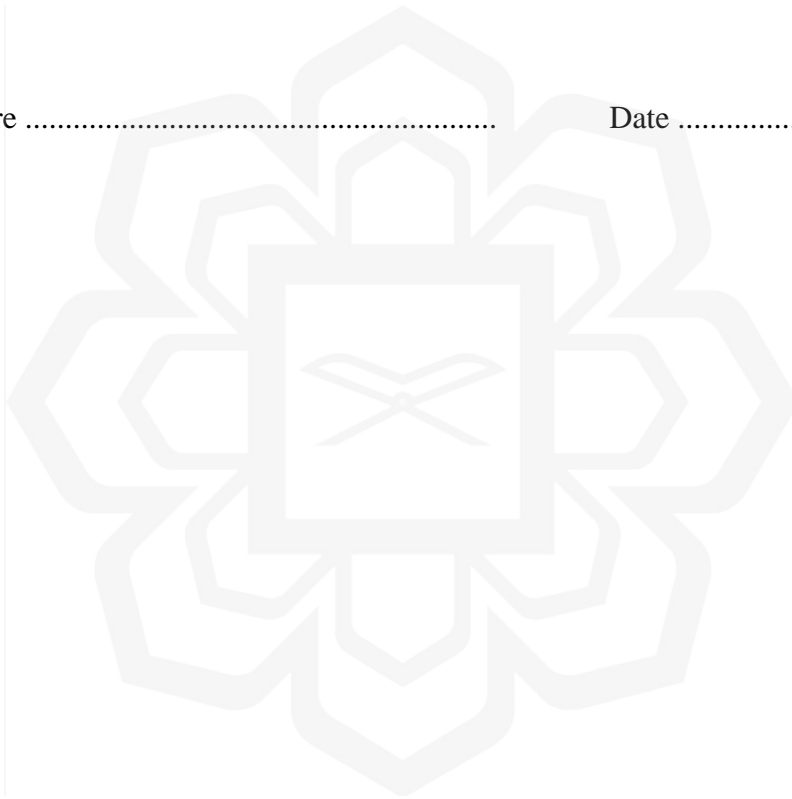
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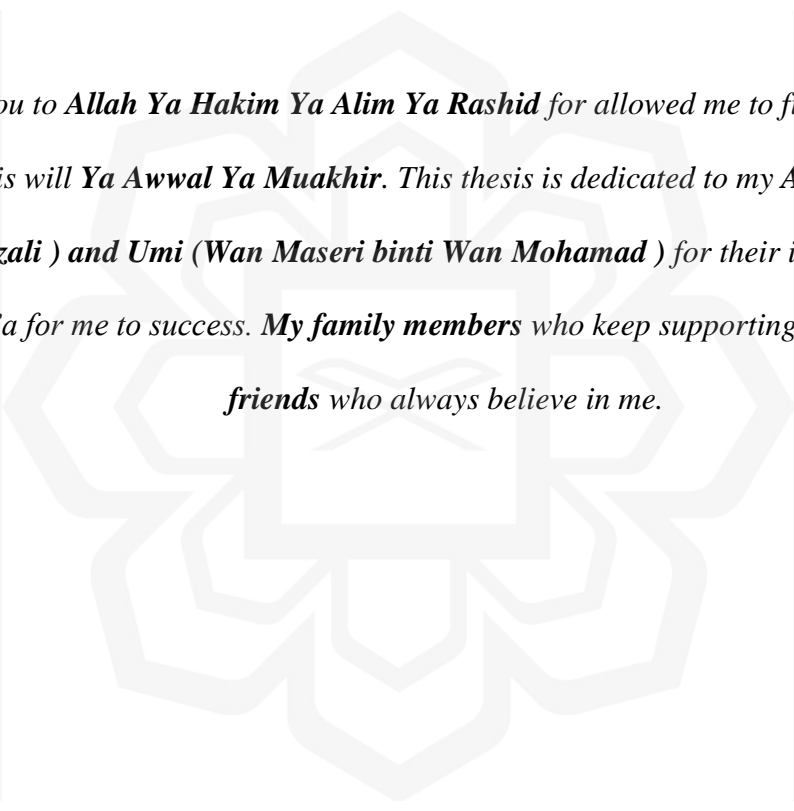
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Thank you to Allah Ya Hakim Ya Alim Ya Rashid for allowed me to finish this master with His will Ya Awwal Ya Muakhir. This thesis is dedicated to my Abah (Ramdan bin Razali) and Umi (Wan Maseri binti Wan Mohamad) for their infinity support and du'a for me to success. My family members who keep supporting and my fellow friends who always believe in me.

ACKNOWLEDGEMENT

All glory is due to Allah, the Almighty, whose Grace and Mercies have been with me throughout the duration of my programme. Although, it has been tasking, His Mercies and Blessings on me ease the herculean task of completing this thesis.

I am most indebted to by supervisor, Asst. Prof. Dr. Julaila Binti Abdul Rahman, who's enduring disposition, kindness, promptitude, thoroughness and friendship have facilitated the successful completion of my work. I put on record and appreciate her detailed comments, useful suggestions and inspiring queries which have considerably improved this thesis. Her brilliant grasp of the aim and content of this work led to her insightful comments, suggestions and queries which helped me a great deal. Despite her commitments, she took time to listen and attend to me whenever requested. The moral support he extended to me is in no doubt a boost that helped in building and writing the draft of this research work. I am also grateful to my co-supervisor, Assoc. Prof Dr.Khalilah Zakaria, whose support and cooperation contributed to the outcome of this work.

I am grateful to have my fellow friends who always supported me, Haziq (my thesis proof reader and editor), Nazurah, Roziana,Fatimah, and my siblings, Nur sufiah, Nur Afifah, my brother in law Abg Latiff and Abg Syakir. Also, my manager at work, Nurul Damia who allowed me to finish my thesis during working period.

Once again, we glorify Allah for His endless mercy on us one of which is enabling us to successfully round off the efforts of writing this thesis. Alhamdulillah.

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CHAPTER ONE

INTRODUCTION OF RESEARCH

1.1 FOOD TRUCK IN MALAYSIA

The soaring and innovative food industry player has shifted their games where food vendors sell their food using moving vehicles allowing them to become portable, thus inviting bigger number of customers segment. The strategy of setting up easy and fast food to serve from vehicle is known as food truck. (Shawahid, Bakar, & Eksan, 2018). Food trucks may have started out as a cheap alternative to a brick-and-mortar restaurant, but they have become one of the strongest business models in the food and beverage industry (Lorry, 2017). Ibrahim (2011) justified food truck as a vehicle that is completed with the equipment to prepare and cook food and has portability to move from one strategic location to another. Although food truck was initiated in America, this trend was rapidly expanding and adopted by other countries including countries in Asia. According to The Star news, it was reported that by 2014, food truck business was announced and accepted as the biggest trend in Food & Beverage industry in Kuala Lumpur. These food truck vendors were starting to have positive competition and mushrooming their business around Kuala Lumpur and Selangor. The vendors started to renovate and improve their truck's interior and exterior to look good and convenience for the business.

The rapid evolution of food truck influenced by demanding from the consumers who are living and growing in urban community that love simple, quick, and effortless grab food available. This factor gives push impact to vendors to

improve and creatively renovate and upgrade their vehicles to be more appealing and interesting. Realizing this opportunity more than anyone else, young entrepreneurs, restaurant owners and the government agencies are also supporting this business to be expanded widely throughout Malaysia and accelerating the economy growth. Despite the fact food truck adopted kitchen from the restaurant into mobile kitchen, the preparation in a compact space back in the food truck container somehow shows different concern in terms of space utilization and working space safety. Working in a small space to prepare food usually correlated with safety, hygiene, space design, and ergonomic element. Back in 2016, food truck has been initiated to have its own designated area which depends on the demand and the places that are mostly visited by nearly 300 customers every day. Since food truck will have more customers and demand, a conducive working space is important, especially during peak hours in a compact space.

This research therefore seeks to discover (i) what are the spatial element in the food truck kitchen, (ii) what are the design recommendation for kitchen spatial in the food truck.

1.2 BACKGROUND STUDY OF FOOD TRUCK EVOLUTION

Based on pilot surveys on these food truck handlers around Klang Valley, most of them have unclear understanding about layout design and safety element that should be in the working environment, especially when it comes to arrangement of mobile kitchen as a small and compact space. However, vendors are still designing and arranging their furniture based on their food preparation behavior and making it fit the size of food truck kitchen. The design layout should involve working environment and this part should have connected with the ergonomic design that will help to improve

working style in the food truck. An ergonomically design workspace will reduce fatigue and stress, and also supporting the workers to work for a long period of time. (Rosmah, Anwarul and Muthamil, 1993). According to Maria et al (2000) people need to be aware with an ergonomic element in the design especially when it comes to working for a long period per day; for example to cutting and preparing the dishes, also need to be considered the height of the table, cabinets and the placement of sharp cutlery such as knife. This is important to create awareness within food truck vendor to avoid the unfortunate cases and to improve the production of the business as well. Some of the vendors do not really consider the escape exit in the truck in case of explosion or fire. The minimum working space can increase the risk of health and safety. Therefore, there is a need to study the element of spatial layout in the food truck kitchen to create the safety and design awareness among food truck vendors.

THE EVOLUTION OF FOOD TRUCK INTERNATIONALLY

Many researchers believe that mobile food truck business will soar in the next five years, generating up to \$2.7 billion in revenue nationally by 2017-up from \$650 million in 2012 (Emergent Research, 2012) . The street vendor business has already started in the early of 70's in New York City. The first in history of street vendor existed started with New Amsterdam which is now known as New York City. It begins regulating street vendors selling food from push carts, it was called as chuck wagon and it slowly transformed into another form of mobile units (Ibrahim, 2011). The chronology of mobile vending evolved through time as technology expanding and advancing, hence the food truck existed as result of demand and people changing their taste from eat at home to take away style (Ginette, 2012). According Che, Farah, Ghazali (2018) said in their research that food truck has potential to expand and to

activate underutilized space and streets through the attraction of urban area, especially when the country itself is already developing the changing of taste and food preferences. Moreover, food truck itself is an easily accessible vehicle and allowed vendor to move around a city and active urban area.

CHRONOLOGY OF FOOD VENDING IN MALAYSIA.

The study of food vending style in Malaysia is constantly changing through time. People started selling ice cream using bicycle and put the ice cream container at the back seat and moving on to 80's decade, people started selling drinks in a small truck. In the early 2010, food truck business started mushrooming the food industry, street hawkers and other food establishments as people most probably seek the place not only to satisfy hunger but a place to socialize. (Lucca, Elizabeth and Torres, 2006). When economy declined almost two decades ago between 1990 until 2000, that was when food truck rose because people want to save money and fuel. The most obvious thing in food mobile transformation is the space planning of managing food, from the street hawking to food truck space.



Figure 1.0 THE NEWS News paper regarding food truck licensing.

Based on figure 1.0, it said that the ministry of Urban Wellbeing, Housing and Local Government, Dato' Ismail Othman said Malacca has given almost 106 permits for food truck business in the local area (The News, 2015). This shows that food truck business is already accepted in Malaysia and will be expanding every year. Food truck also is improving the servicescape which makes the environment of business and eating related to customer interaction, the performance, and the communication of the services (Zeithaml, Bitner & Gremler, 2006).

Researchers believe that mobile food truck business will rise in the next five years, generating up to \$2.7 billion in revenue nationally by 2017. Hawking and street food vending are the significant culture heritage, and it also contributes to the Malaysia's economy (Yasmeen, 2001).

1.3 RESEARCH PROBLEM

With the evolution of food truck and it is elevating the country's economy, this business surely has massive demand from entrepreneur. In the Malaysia Budget 2019, Lim Guan Eng has stated to have agencies who supported the food truck business to help the B40 group in Malaysia. Selangor state has been providing affordable food truck for startup in a collaboration with Yayasan Selangor and has been provided almost 30 units of truck since November 2017. Even though the process to start a food truck business has been made convenient, one must not neglect the fact that food truck adopts the compact kitchen concept; which is preparing the food on the go with a minimum space. Kitchen space is synonym with health hazard and accidents. The productivity in the kitchen is related with the intuitive ergonomics; when the kitchen equipment is matched with human anthropometry and with human behavior involved according to Charytonowicz, Jerzy & Latala, Dzoana. (2011). Therefore, this research analyzes the food truck kitchen with spatial analysis and identifies the vendor's behavior, and the factors that affected the food truck kitchen spatial design.

1.3.1 Hygiene and Safety

Another issue related to the food truck operation is the hygiene and safety. Based on the report in (The Star news, 2015). One of the food truck vendors mentioned "*We also have to consider the fact that rubbish collection is still our responsibility after they pack up and leave. Some of them also complained "Some might not even know how to dispose off rubbish properly".* Vendors, however, didn't consider the hygiene issue inside and outside the operation space as their responsibility. This is somehow

related to space planning and design inside of the food truck, vendors should aware on how to manage their waste after business operation.

1.4 RESEARCH AIM

To study the spatial elements in the food truck kitchen and to propose a design recommendation for food truck kitchen's spatial layout.

1.5 RESEARCH QUESTION

This research is guided by the following research question.

1. What are the elements in the food truck kitchen spatial in selected area in Klang Valley?
2. What are the recommendation for for food truck's kitchen spatial layout.

1.5 RESEARCH OBJECTIVES

1. To investigate the elements in the food truck kitchen spatial.
2. To propose the design recommendation for food truck's kitchen spatial layout.

1.7 RESEARCH GAP

This research is to fill in the gap of research study regarding spatial design in the food truck kitchen. There are 11 aspects in previous studies regarding food truck, which are safety, health, regulation, business opportunity, urban facilities, school, cleanliness, rural area, social media, location and zoning and lastly the design interior or exterior. The research gap detail will be discussed in the table 1.0.

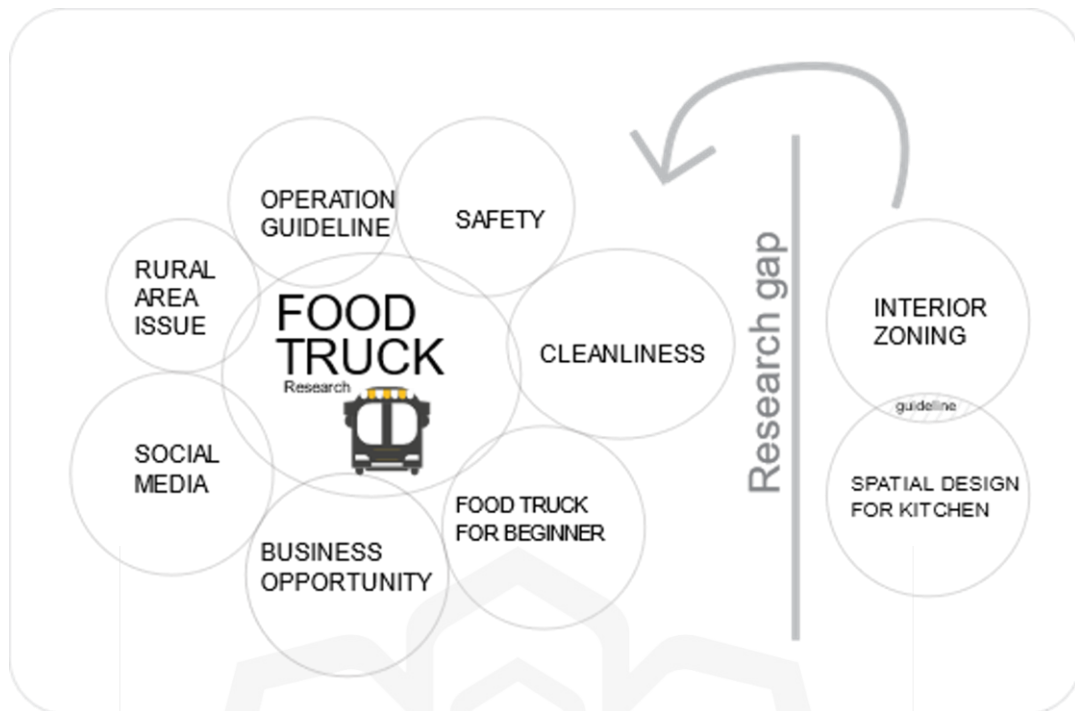


Figure 1.2 Research Gap in Kitchen Spatial Design in Food Truck research

1.8 SIGNIFICANCE OF STUDY

This study is a significant endeavor in spatial elements in food truck spatial layout especially when it is related to compact kitchen working space. It is something the food truck vendor should consider before starting the food truck business. This study should be of help for the recommendation of design layout in the kitchen food truck. Food truck owner can gain understanding of ergonomic concept in food truck since there is no clear study or proper understanding about food truck ergonomic measurement and working space efficiency. This will help to reduce fatigue or small accident while working due to uncomfortable measurement of the space in the food truck kitchen.