

## SPATIAL ANALYSIS ON LOCAL FOOD TRUCK IN KL

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### ABSTRACT

In their continuing search for competitive differentiation, the Food and Beverages (F&B entrepreneurs) are now turning mobile vendor including food truck as new and promising business proposition. While the growth of food truck in the current trend, the vendor's creativity and consumer's demands influencing the evolving of food truck business in Malaysia. 3 kinds of food truck categories have been observed; Local food, western food and beverages. Space allocation is one of the most important and crucial part to create the spacious food truck interior for convenience of food truck vendor to operate their business. The mobile vendor chronology from the year 70s until 20s shows that there several movement designs in term of food truck space allocation and user circulation. This study aims to analytical study on the movement advancement of food truck chronology from international and local food truck and to find out the factor affected the circulation and interior design of the food truck. By using the pilot study and observation of line up study methods the result shows that type of food truck and type of food servings influenced the interior circulation and safety issue of the food truck operation. The findings show that there are few factors that affected the changing of the food truck interior circulation, and the study should be carry further deeply into universal design study that will include all type of users and possibly vendors with disabilities.

**Keywords:** Food truck, Spatial Analysis, Ergonomic, Safety.

### INTRODUCTION

This study is to conduct a spatial analysis of local mobile food truck focuses on Kuala Lumpur. Therefore, the objective of this research is to identify the existing food truck spatial planning done by the food truck vendors. Food truck vendor has been progressively increasing year by year. In Malaysia it started from 2010 then it has become a trend until today 2018. Food truck also noticed the most choice business startup by the young entrepreneurs (Cardoso et al, 2014) . The food truck concept is exciting and stimulating make it easy and it also the combination of variety concept, design, and facilities increasing the fame all over the world.( Siti, Salwa, 2017). Conversely, food truck industry grew more rigorous based on service scope where food truck can be seen anywhere here in Malaysia. (Siti et Al, 2017)

## LITERATURE REVIEW

### **Emerging of Food Truck in Malaysia.**

The food truck industry in Malaysia started by the development of street hawkers, food truck, night market and downtown mushrooming as this will lead to big supporting F&B industries in Malaysia. Malaysia started the mobile food vending roughly from the 1920s and now Malaysia is currently still in the fame of food truck. Food truck now has conquered the modern and traditional food to make it on the go and this consist of various type of menu and a countless number of food choices. Today, there are an expected 70 modern food trucks in Klang Valley alone with middling of 5 food truck opening each month. Recently in 2017, MARA released almost RM100,000 to support the young entrepreneur to start the food truck business. (Bharian, 2017) . Consequently, the food truck is the most effective and demanding business nowadays. In today competitive industry, food truck competes among themselves to maintain their customer's demand.

### **Food Truck adopting the open kitchen concept.**

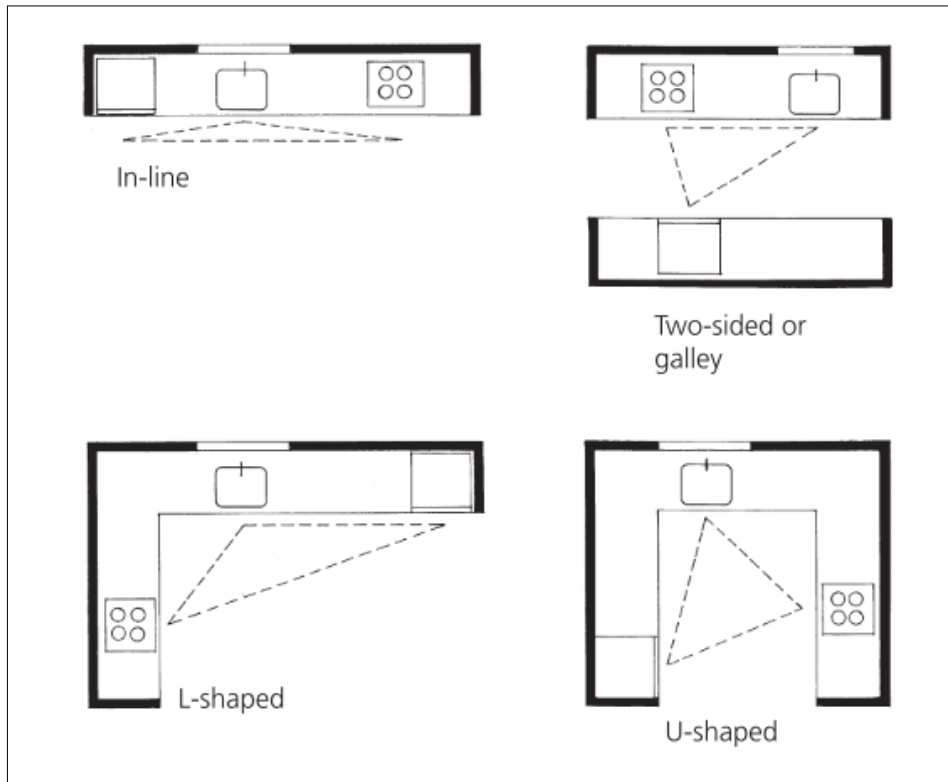
The classification of includes food truck is a mobile kitchen, canteen or catering truck that sells food or drinks. Since all the food truck design has an opening hence this concept closely related to open kitchen concept. This concept has become popular back in the 1990s (Baraban and Durocher, 2010) but today small and large restaurant has largely used open kitchen setting as an operation. This open kitchen concept refreshing injecting new life in food truck however very little is known, for instance, about areas correlated to open restaurant kitchens from an academic and design perspective. (Abel, Martin, 2010). Instead of open kitchen concept, food truck also adopting the concept of the compact kitchen.

### **Ergonomic workspace of a food truck.**

Workplace is an important space that speeds the activity and reduced minimum stress on the workers. Thus, workspace must get extensive attention in the designing of the layout, seeing the importance of kitchen platform, there is need to design kitchen and ergonomically evaluation of kitchen. (Abel et al, 2010) . Ergonomic design always referring to safety, the productivity of the worker, time reducing, and also to avoid the effect of fatigue and accident that correlated to the workspace. (Pinto, et al, 1999) . In the case of a food truck, as a compact kitchen adoption from brick-and-mortar restaurant, this concept should not be neglected.

One of the ergonomic workings in kitchen developed at the University Illinois in the 1940s, is the kitchen 'work triangle'. This model based on the three work centers in the kitchen which are: refrigerator, sink/dishwasher, and cooker. (Baden-Powell, 2005). The idea is to put these three centres to form a triangle

shape steps to have most efficient distances apart to reach the best arrangement for the space available and to minimise traffic within the work space. (Kishtwaria, Mathur, & Rana, 2007) supported the suggestion for kitchen layout and states that the perimeter of the work triangle should not exceed 7 metres.



**Fig.1:** Work Triangle in the kitchen by (Baden-Powell,2015)

The figure above shows the layout based on ‘work triangle of frequently used elements. For safety reason, the flow should not crisscross with the triangle. The total of lengths of the triangle sides should within the certain quota maxima of 7000mm for ‘small to medium-sized kitchens’ or 8000mm for ‘large kitchen’ (Kishtwaria et al., 2007)

Worktop height optimal height for the kitchen working surface. The anthropometric should be considered for the user and the effective working level may range from 100mm below the worktop height also same with operating with another machine.

The recommendation of kitchen guideline for proper space a) Always consider kitchen size, number of working staffs. b) The size should be in the middle of exceeds or deceeds the work triangle path for example from the kitchen to the cooking station and preparation center should not surpass 7 meters. c) The work surface should be durable, neat non-absorbent, stain resistant and easy to clean. (Kishtwaria et al, 2007). This recommendation also factors should be reconsidered by the vendor at least in their food truck.



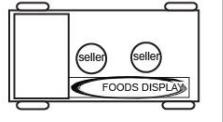



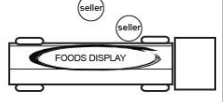



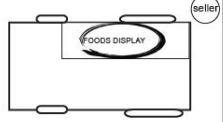

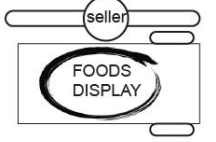

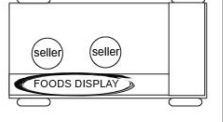

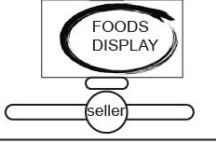

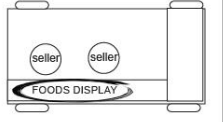

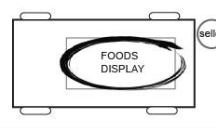

### **Safety and healthy environment of the food truck kitchen.**

Based on pilot surveys, food truck vendors working hours achieve more than 12 hours. This including preparing food and opening timing according to designated permit they were applied. Some researcher suggested that the cleanliness and working style also be part in trust of the customers to choose the food truck. ( Worsfold,2006) . Unfortunately, due to lack of understanding in designing and arrangement of the food truck interior, the food safety, and healthy working environment hard to fulfil. (Aksoydan, 2007). Safety in a working environment closely related with the way kitchen is designed, particularly in areas such as a where the employees preparing the food. Conversely, considering a better design of the kitchen that will uplift the employyes safety is a must before starting the food truck business. ,Ghisseli et al (1998). Many vendors doesn't understand that, in the restaurant they are called as "cross-tracking "that encourage too dangerous position that will occurred in small space especially in compact kitchen (Stipanuk,2016). This will happen when the employees are forced to cross paths when they are preparing foods at the same time handling with customers order in one compact space. Minimizing cross-tracking will most likely reduce the accident, but in the case of the food truck, to avoid this cross-tracking is quite impossible because of the small space, hence to improve the arrangement it should be within the interior design and circulation design carefully before started to open the food truck this also will maximizing the productivity of working especially during the peak hour.

## OBSERVATION THROUGH LINE-UP STUDY

### International and local food truck devising

**Table.1:** The comparison of chronology of international food truck and local food truck layout.

| YEAR  | INTERNATIONAL   |   | LOCAL   |   |
|-------|---|---|---|---|
|       | LAYOUT DRAWING  | PICTURES  | LAYOUT DRAWING  | PICTURES  |
| 1860s |    |    | —   | —   |
| 1870s |    |    |    |    |
| 50s   |    |    |    |    |
| 80s   |   |   |   |   |
| 90s   |  |  |  |  |
|       |  |  |  |  |

The table above shows that the chronology of both international and local mobile food vendor layout design and food truck invention. It was started with simple cart for everyday lunch outside the news company and the community area during night time. (Hirsh,2011) . Starting from 1980 people began to use the food truck to set up the food. Some study supported that food truck originally started as a truck that supplied food for the factory and construction worker with the lower price (Ibrahim, 2011) .From the pre-elementary study of food truck chronology, these are an element that contributed to food truck development; the type of foods, the design

outside (branding & mechanism of food truck enhancement), interior design (ergonomically design and arrangement).

Based on Hawk, 2013; Ragavan 2014 the mobile truck can be characterized into three different types, which are the traditional food truck, the latest comer food truck, and the restaurant based food truck. The traditional food truck is selling traditional and local food using SUV or truck. This category does not really consider about branding because they are focusing on the quality and repeating customers based on the food they are preparing.

In the case of an international food truck (based on the table), the vehicle used only the wagon structural, this design only enough to carry the food to sell. Moving fast 1870, in Australia they started using conventional truck to sell instant food. On 1970s, one vehicle imitates a hotdog shape invented to literally shows what they are selling during that time. This shows that they designer during that time considering the brand equity to proposed brand reputation and commercial image as part of the equity, researcher agreed the important of brand equity for the industry especially related to food service industry to have their own brand and image to perceived quality (Lee, 2014; Majid et al., 2016). In this case, they are using hotdog shape as their brand awareness. The layout was drew to shows the interior of the food truck, each food truck has different style and arrangement to prepare food and to entertain the customers. It is also depends according size of food truck and type of food serves.

Malaysia started a bit later from international food cart where 1920s people started selling food using a bicycle, during that time, the bicycle is the transportation that people mainly used. But the mobile vending has started. Still in the 1920s the food vending business enhanced by using motorcycle and looked at they put the food display still the same until 1970s people in Malaysia started using the truck. This is also the same as an international food truck, they are selling local food and neglected about the brand equity not to mention the design of the truck or vehicle. This business then without branding but according to Sulaiman & Haron (2013) they spreading using word-of-mouth, and willing to revisit in the future also can stay longer. The food display keep changing layout based on the timeline until they using the truck as a food truck in the 1990s, people have more space to look around and more type of foods and stuff can be sell. Latif et al. (2015) stated that in the competitive market, brand image contributes to an important role to bring the customer to differentiate a company from others. Compare to the traditional food truck, the modern food truck come out with a fresh that is more visible and recognizable (Loomis, 2013).

The chronology shows the difference between traditional and modern food truck can be differentiated by the branding and design of the food truck exterior. On the other hands, the layout keeps changing followed by the type of the vehicle and food they are preparing.

## **RESEARCH METHOD**

An analytical literature study has been made related to ergonomic intervention in space design in a food truck. Ergonomic design in food truck exterior and interior design is very important to food truck vendor and conducive environment. Also, the local and international chronology lineup study has been analytically studied. This study adopted qualitative methods of data collection. To determine the spatial study of food truck interior, the observation and pilot survey on measurement and arrangement of food truck interior has been done in 10 food truck in Kuala Lumpur (KL) and Selangor, Malaysia; Sun Steamboat (Taman Melawati), Ken's Food Truck (Kota Kemuning, Shah Alam), Hard Rockers Burger (Jalan Gombak), Putu Bamboo (Jalan Gombak), Ice Blended (Jalan Gombak), Impresza Seafood Connection (kampong Changkat Gombak), Impresza Iced Coffee & Tea (kampong Changkat Gombak) . De Danau Grill (Tapak foodtruck park, KL) , Chef Pak Cik Kluang. (Tapak foodtruck park KL) and Mobile Chef Thai Cuisine (Tapak foodtruck park , KL). The dimension of the space used to identify the space circulation according to ergonomic principle and classified by different type of food servings.

## **ANALYSIS & FINDING**

The study found that the design circulation and interior of the food truck affected by 3 factors;




- 1) The classification of the food truck used,
- 2) The Installation of the furniture and equipment for different type of food.
- 3) Safety issue on the food truck circulation.

However, above these all factors there is a safety issue need to be considered. The study also found that different type of food servings has different level of safety need to be measured, and the type of the furniture also help in term of safety for the vendors.

### **Classification truck that used for food truck**


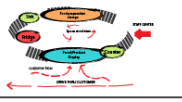








A total of 10 food truck samples has been categorized using these truck duty classification.

**Table 2:** Table of US GVWR Classification that found in each food truck in Malaysia.

| Class/ Duty Classification |             | Truck   | Weight Limit     |
|----------------------------|-------------|---|------------------|
| CLASS 1                    | Light truck |  | (0–2,722 kg)     |
| CLASS 2                    | Light truck |  | (2,722–4,536 kg) |
| CLASS 3                    | Light truck |  | (4,536–6,350 kg) |

A total of 10 food truck interior design layout has been analyzed as shown in table 4; 1)Sun Steamboat (Taman Melawati), 2) Ken’s Food Truck (Kota Kemuning, Shah Alam),3) Hard Rockers Burger (Jalan Gombak), 4) Putu Bamboo (Jalan Gombak),5) Ice Blended (Jalan Gombak), 6) Impresza Seafood Connection (kampong Changkat Gombak) ,7) Impresza Iced Coffee & Tea (kampong Changkat Gombak) . 8) De Danau Grill (Tapak foodtruck park, KL) , 9) Chef Pak Cik Kluang. (Tapak foodtruck park KL) and 10) Mobile Chef Thai Cuisine (Tapak foodtruck park , KL).The spatial interior design were analyzed to determine its dimension and ergonomic of the kitchen arrangement, including the safety, hygiene and cleanliness consideration.

**Table 3:** Different food truck and spatial drawings shows the interior of food truck.

| TYPE OF FOOD | Type of Business   | Space Layout and Circulation  | TYPE OF FOOD | Type of Business  | Space Layout and Circulation  |
|--------------|--|---|--------------|---|---|
| WESTERN FOOD | Hard Rockers Burger (Jalan Gombak) Class 3 Light Duty                    |  | LOCAL FOOD   | Putu Bamboo (Jalan Gombak) Class 2 Light Duty   |  |
|              | Ken's Food truck (Kota Kemuning, Shah Alam) Class 2 Light Duty           |  |              | Chef Pak Cik Kluang. (Tapak foodtruck park, KL) Class 2 Light Duty                    |  |
|              | De Danau Grill (Tapak foodtruck park, KL) Class 2 Light Duty             |  |              | Mobile Chef Thai Cuisine (Tapak foodtruck park, KL) Class 2 Light Duty                |  |
|              | Impresza Seafood Connection (kampong Changkat Gombak) Class 3 Light Duty |  |              | Sun Steamboat (DATSUN620 FOODTRUCK) Jalan Bandar 4, Taman Melawati Class 1 Light Duty |  |
| BEVERAGES    | Impresza Iced Coffee & Tea (kampong Changkat Gombak) Class 3 Light Duty  |  |              | Ice Blended (Jalan Gombak) Class 2 Light Duty   |  |



The result shows that the Food truck in the data classified into 3 types of light-duty truck, which is class 1, class 2 and class 3, and the food truck also has been categorised into 3 section of food selection, Western food, Local and Beverages. The trending nowadays they modified the class 2 light duty truck and install the equipment and turn into a food truck. All the 10 food truck has their own branding and design according to different type of food. The opening of exterior door food truck and the entrance most of the truck are the same entrance circulation. The circulation of the spatial design inside the food truck depends on the type of food servings. Food truck like Danau Grill and Chef Pakcik Kluang has their own grill, and has their own place to prepare the food and also sink inside the truck and this made the circulation compact more than the others. Food truck that preparing heavy dishes such as Chef Thai and Pakcik Kluang have the most compact space Meanwhile the better space circulation when the food servings is only making an ice blended and drinking and also putu bamboo that just needs only small space of steamer (Figure 3a and 3b). The center of circulation is easy and don't have any cross-traffic inside the truck. The space itself is in comfortable area and arrangement. Even though the space inside is compact, somehow, the vendor managed design better circulation



(a) (b)  
**Fig.2:** Spacious space in Impresza Ice Coffee food truck and Putu Bamboo food truck.

### **The Installed and non-installed furniture in the food truck.**

Based on the study, these food truck also can be categorized by using installed furniture and non-install furniture. Some of the food truck was bought with the furniture installed inside most of them using steel materials for the sink, storage, and stoves. Another food truck using non-install furniture which means they are putting the existing table and storage box inside the truck. It is all depends of the type of food they are servings. The non-installed furniture somehow shows lack of safety element within workspace because it is not suitable within the

space itself. For example, in figure 4.2(a), the Impresza Seafood Connection food truck is serving Char Kuey Teow in the menu, however the table size is too big to fit the purpose of food preparation, the vendor can get a smaller table and install it permanently following suitable size and also considering the number of workers.

### **Safety Issue of the food truck circulation**

However, in the case of installation furniture in a food truck, Chef Pakcik Kluang truck (Figure 4.2 b) showed more manageable space even though they are cooking and preparing heavy meals. This study suggested that an installed furniture food truck is more manageable, clean and safer rather than non-installed furniture. The western food servings food truck are more to likely to use the installed equipment rather than local servings and beverages. However, the measurement and height of working table and storage need to be carefully considered by employees. Since space is too compact for cooking equipment, there is no space to sit and rest for employees inside the food truck. This is regretful somehow employees need to stand all day while working and only can rest at the seat inside the truck.

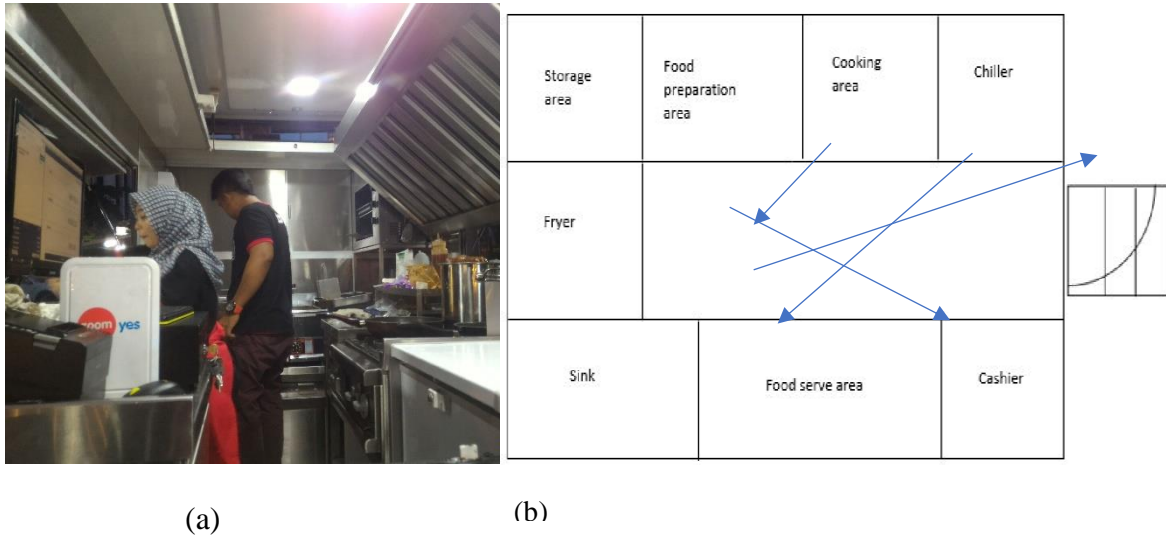


(a)

(b)

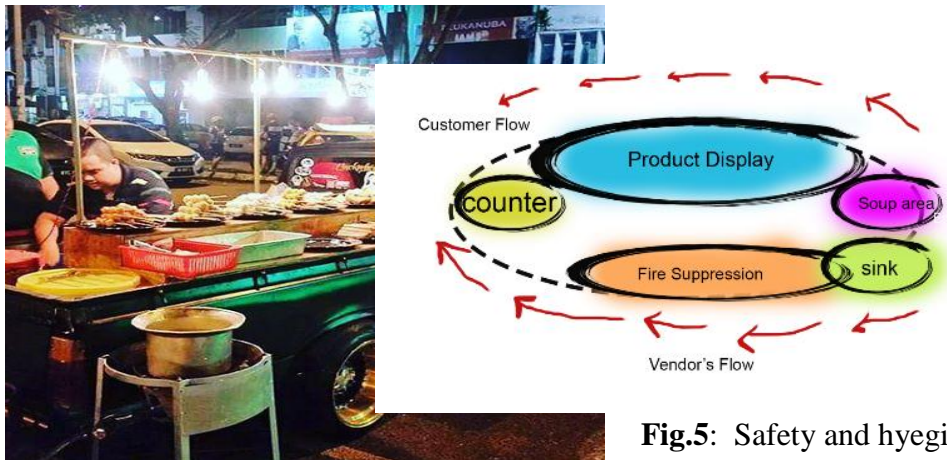
**Fig. 3:** Non-installed furniture and installed furniture in the food truck.

In Chef Pak Cik Kluang food truck, the furniture is partially installed inside the truck, and according to work triangle, this interior circulation does not fulfill the space required in the ergonomic compact kitchen. The workspace is a risk in a small accident due to cross-traffic of small space and exposing to fire even worse. The blue arrow in Figure 4.4b shows that the circulation is beyond the work triangle. The cross traffic will happen and cause uncomfortable working environment and safety.



**Fig. 4:** Work triangle of kitchen space in Chef Pakcik Kluang.

Meanwhile, in the case of circulation and opening, Sun Steamboat Figure 4.5 has a better opening for customer circulation. There is no circulation inside the food truck and make it easier to see but depends on the food they are selling. The circulation goes around 360 of the truck so that connection between seller and customer is easy. However, this food truck lacking safety and hygiene issue. The boiling apparatus locate near to gas filling truck. Considering the hygiene issue that there is no storage fixed for dustbin or food waste



**Fig.5:** Safety and hygiene issue with Sun Steamboat,

Melawati.

## **CONCLUSIONS AND RECOMMENDATIONS.**

Many food trucks in Malaysia, especially in mass area Kuala Lumpur and Selangor, are using the same concept of food truck. The different is the arrangement and circulation of the food truck and the branding of the food truck. The 10-case study of food truck all this suggesting western and local food can be successfully mobile. The arrangement and design of the food truck always depend on the type of food servings, with the purpose of this, the vendor should realize and consider the space usage and try to minimize waste space by using unnecessary wrong size for the kitchen installation.

Finding from the study indicates that the future food truck circulation could be better with the permanent installation of furniture and list down the activity of the workspace to make it easier to detect how to arrange the furniture. The classification of the food truck should have decided by the type of business they made. In fact, the vendor should be aware of ergonomic space design is important for the working environment for the employee's safety. The design will give an encouragement to employees to do their work without worrying the uncomfortable space and safety. Vendors should minimize movement from one working space to another (according to work triangle) this path should not be crossed to avoid a dangerous accident in the food truck.

The recommendation of this research is to further study deeply on universal design on the food truck. This is including the PWD's (people with disabilities) and other users as well. The study should be more on the client and the circulation outside of the food truck and the workers who are possible with disability. Hence, with having the universal design as the key indicator for the food truck interior, this issue could bring food truck business up to another level.

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