Food Production and Distribution from Home Industry in Kampung Kota Jakarta: an Exploration of Urban Spatial Trajectory

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Abstract. Foods produced in the kampung area by home base entrepreneurs or people who gather for home industry/food domestic industry. Foods journey creates a route of production and distribution process that generates a hub. Therefore, the processing of this food has a trajectory that is beyond the local territory in a kampung. The range of food processes is represented by a theory of spatial trajectories to see the process of food production and show the spatial system, which is a part of food mobility. Observation of food routes is carried out by paying attention to flow, network, and motion using space syntax methods. The results of this research using space syntax methods will show the spatial trajectory of the product exceeds beyond kampung area, which makes it an important hub.

1. Introduction
Jakarta is the capital city which accommodates a large production and distribution spread from various places, one of which is the kampung area of Kota Jakarta. Kampung is a group of housing areas which is part of a city (usually occupied by residents with low-income). But there are many kampungs in the Kota Jakarta that are located in areas that are rarely known by city residents. This is because the location of the kampungs in the Kota Jakarta has an irregular area structure. Therefore, food journey from a home-based business in Kampung Kota Jakarta can be a path guide or information on the location of the kampung.

The home industry business in kampung areas is carried out as the businessman wishes by utilizing the home as a place to process food. The spread of this food is considered to be a journey to which then the food is consumed by the people of Jakarta. It can be seen from the production and distribution of food from home businesses in kampung areas, which are in demand by many people around.

The production and distribution of food involve several stages, beginning from the raw food material, processing, production, and distribution. The sequence of stages for the food’s journey can be called the trajectory. The food’s journey also involves other aspects, such as the transportation being utilized, supporting objects, the role of the subject towards the food, and the surrounding situation. The occurring food’s journey will indicate the different location of each process by the sequence of activity. The difference in location is influenced by the movement and displacement of food following its direction and destination, thereby forming a pattern of space from the food. The pattern of space and displacement of location can shape the urban spatial trajectory, which can indicate...
a new space from the intersection or confluence of paths, as well as the importance of a location. The importance of a location is seen by how big the location plays a role in the food’s journey, which can be called a hub.

Food becomes the main object in explaining the trajectory to indicate urban spatial trajectory. Food is an object whose journey is very complex because it goes through several stages of the process. The journey sequence (trajectory) of food can indicate how to read maps by explaining the routes taken by food. The food trajectory route will shape the special urban trajectory. The purpose of studying urban spatial trajectory is to view the condition of the environment affected by food, gain knowledge on food space in important locations within the ongoing trajectory and connectivity, and view the process of forming a new space which will become the basis of the food trajectory.

Kampung Muka is one of the kampung areas in Kota Jakarta. Kampung Muka is located in Jalan Kampung Muka, Ancol, Pademangan, Kota Jakarta Utara, Daerah Khusus Ibukota Jakarta. Kampung Muka became the location for a case study research because Kampung Muka is considered as one of the complex kampungs, meaning there is a high number of residents with several home food industry that varies. The food process itself is also complex because it uses its tools and equipment, whether it be modern or traditional tools. Also, the initial capital that they possess becomes their own intention to support each’s livelihood.

The food business, which is a study material in this research is Kerupuk Ikan Palembang in Kampung Muka. Kerupuk is a snack made from the basic ingredient of flour. Kerupuk Palembang was chosen in this research because its distribution process reaches several areas in North Jakarta. It became an interesting subject to find out how far the kerupuk is distributed, even though the production is only in the Kampung Muka area.

Wei, She, and Ma [1] in GPS Trajectories to Explore Foodscape Exposure, research in Beijing, states that food can shape the spatial degree based on everyday direction and displacement. The spatial trajectory in food is manifested in the movement of food activity space, which is based on direction and time, as well as the subject and location of the food activity [1]. The food activity will move following the food’s stage of the process; thus, they suggest that food space in Beijing has a relatively wide radius because the spread of food reaches the city center.

2. Method
First, we visited Kampung Muka, Jakarta to see the food’s journey from one of the home food businesses. Once we have identified the food which will become the research subject, we will conduct interviews regarding the food’s everyday journey to gain a general food trajectory. Second, we conducted direct observation within a day to see how the food trajectory occurs, such as the process of food production, the route shaped from the food’s journey during production and distribution process, and the location of the food’s stop. Therefore, the data collected from the direct observation includes interview transcripts, field notes, and documentation in the form photos, videos, and timestamps from the application my tracks. Afterwards, all the data is combined into one entirety to be categorized into several categories which are required to achieve the purpose of this research. After that, we gather all the data to be analyzed through trajectory theory. The trajectory theory will explain the definition, explanation, and method in explaining urban spatial trajectory.

Table 1. Data collection techniques are based on trajectory theory

| Data | Methods | Purposes | Theory | Trajectory |
|------|---------|---------|--------|------------|
| Transcript of interviews regarding food movement processes | Interview | Identify the initial description of the trajectory | Food trajectory and operation | Trajectory (motion), |
| The process of Observation | | Identify food | | |
3. Results and Discussions

3.1. Food Trajectory: Kerupuk Ikan Palembang in Kampung Muka

According to the Standard Dictionary for Indonesian Language, the trajectory can be defined as roads and crossings. Roads and crossings are influenced by objects which are connected to position and time [2]. In complex terms, the trajectory is the data obtained from the position of an object that moves throughout time, by taking into account the context [3]. There are three aspects that influence an object moving in a trajectory, namely the sequence of position, attribute, and time [4]. The movement and displacement of objects will continuously be updated by different time and positions. The movement and displacement of objects are also affected by attributes, which serve as the subject or object that influences trajectory. Attributes highly affect how the course of the trajectory operates. Therefore, the trajectory is the science that is viewed from a process in which every situation occurs as it is. This process is viewed from the movement and displacement of objects or the main subject in which there is a contextual role that influences it. The trajectory of an object or subject will show the order of a story that is more detailed and clear. The order of objects explaining their process and the time sequence of displacement from different locations, so that the resulting time and location is important in a trajectory.

The Kerupuk Ikan Palembang business in Kampung Muka has a food process sequence that is likely to be the same every day. Some types of the kerupuk travel process becomes an important process, so that the kerupuk are summarized into the general trajectory. A summary of food travel sequences describes the stages of production and distribution that occur in kerupuk.

![Figure 1. Kerupuk trajectory based on interviews.](image_url)
Table 2. Information on the pattern of determining paths based on time in kerupuk trajectories.

| Time       | Path Determination Pattern Information                                                                 | Information |
|------------|----------------------------------------------------------------------------------------------------------|--------------|
| 10.11-10.30| Kerupuk go according to the seller's plan, that is, first, the seller visits the Sunter Kerupuk Factory to pick up a few packets of kerupuk that will be distributed tomorrow. The seller uses a road that is often passed to get to the factory, which is a large highway. The road was chosen by the seller because at that time, the road was not too crowded or not jammed. | Wholesaling  |
| 10.30-10.50| The seller goes to the first subscription shop to fill the empty kerupuk gondola. The trip uses a big road that is often passed by the seller, but on the way, there is a National Labor Day event that makes the seller had change direction to go to the store. | Distribution |
| 10.50- Finished | The seller goes to another subscription shop (according to the original plan) that runs smoothly. But when all the planned subscription stores have been visited, the seller receives a telephone call from another subscription shop owner (not including part of the plan) to come because the kerupuk gondola is empty, so the seller continues his journey to another subscription shop. |              |

Figure 2. Map view kerupuk trajectory based on direct observation.

Figure 1 describes the kerupuk trajectory that always occurs, starting from the purchase of kerupuk from the factory until it resold to several stores of business customers. Figure 2 shows the route formed from the journey of kerupuk so that there are several stop areas or locations where it spread in the context of North Jakarta. The way to distribute kerupuk is by making appointments to several souvenir shops in the North Jakarta area. Every two days, the kerupuk is delivered to those shops. However, if the kerupuk are quickly sold out in some stores, the kerupuk can be delivered to those...
stores every day. The kerupuk’s journey when moving from one place to the next is through the main roads. Hence its path crossing is located in the location map. Therefore, the kerupuk trajectory does not necessarily operate every day.

The kerupuk’s travel is active mobility because its movement and displacement are in line with its direction and destination that has been designated by the seller. Hence, the trajectory line formed follows the direction of its destination. However, the kerupuk’s journey from point 2 to 3 had a change of direction, because, during its journey, the kerupuk found an ongoing demonstration of National Labor Day, forcing the kerupuk to return to its previous route before reaching point 3. A new event will change the trajectory, thereby making the kerupuk’s trajectory, not in line with what the seller wished for in terms of the travel route. Kerupuk has a fairly long (25 minutes) temporal time due to the movement and displacement of objects whose distances are far. For this reason, the kerupuk’s journey is assisted by motor transportation (attribute) and plastic so that the kerupuk does not catch the wind (attribute).

3.2. Complex Network of the Kerupuk Trajectory
The trajectory can be analyzed to recognize the trajectory’s behavior, which is a complex network. The network is closely tied with the displacement and movement of the object. The trajectory can be called the spatiotemporal from the evolution of a moving object. Hence it is represented by object sequence to indicate the position detected by track [5]. This, in turn, makes the interaction between the moving object in determining the trajectory behavior by using a complex network. A complex network is a mechanism to analyze several data with objects that have its connections, hence the network is called nodes that have a connection in between [5]. Therefore, the trajectory on a moving object from its mobility will cause spatial network [6]. The spatial network is determined by the mobility of the object that is limited by its network of space. Hence it does not move freely, and its position must be in by the direction of its path. The network of a trajectory is modeled by using graphics from nodes and its connection.
Figure 4 explains the location of stops for the kerupuk, which are important in shaping a trajectory. The sequence of the stops is based on the locations from the closest to the farthest from Kampung Muka. The kerupuk trajectory causes these locations to have a connection that is based on the kerupuk distribution. Figure 4 also indicates that kerupuk always visits the same places every day, but its path is always different because it is influenced by timeline aspect on certain days. Therefore, a map view trajectory is represented by strong time and weak time.

Figure 5 explains that the stop locations are categorized into two things, namely strong time and weak time. Strong time is an area that is frequently visited by the object, whereas weak time is an area that is not frequently visited by the object [7]. The Sunter Kerupuk factory and other shops become
strong time because the *kerupuk* is obtained from the factory, and the shops are the *kerupuk* customers. The other stops are called weak time because some shops are only sent *kerupuk* every two days. The path taken every day is also the same, which makes the change in trajectory dependent on the situation in certain days, such as the destination shop and the number of *kerupuk* sold. Figure 5 also indicates a spatial pattern or new spatial formed from strong time location. The line from the spatial pattern explains that the line is the basis for the *kerupuk* trajectory route with the same path.

![Figure 5. Urban spatial *kerupuk* trajectory based on the area of the *kerupuk* travel paths that occur and the pattern of the *kerupuk* strong time area.](image)

The strong time location in the *kerupuk* trajectory can be used as an initial foundation in showing urban spatial trajectory. The pattern of combining the strong time area is a pattern that occurs because these locations are almost visited every day by the *kerupuk*. So that, the *kerupuk* trajectory path during direct observation (path between strong time locations) becomes a supporting factor in determining urban spatial trajectory. Therefore, from the two line patterns, it shows the existence of a new pattern (green area) which becomes an urban spatial trajectory of the *kerupuk*, namely the compact area for the *kerupuk* business trips in Kampung Muka.

### 3.3. Kerupuk Business in Kampung Muka as a Hub Based on Trajectory

Hub is a center that connects networks. A hub can be correlated with trajectory. In determining a place as a hub, one can view the route of the object. The route of an object in a trajectory will create a connection between location and displacement of an object. The displacement of an object is based on the existence of an origin and destination [8]. If the origin location has facilities which are important and influential to the activities surrounding it, then that location can be called a hub. According to O’Kelly [8], the destination locations of these objects can be called nodes, which are an important part of a network. This is because a collection of nodes has connectivity; therefore, there is an interaction between spaces. The connection between the place of origin that is known as a center with the connecting places is known as a hub and spoke network [8]. Spoke is a hub which connections to several networks or nodes [9]. A hub and spoke network can indicate the level hub of an object.
Figure 7. Table and model of spoke-network. A single hub consists of one hub and several nodes whereas a multiple hubs consists of several hubs and one node. The interconnectivity or network between hub and node is based on the flow or direction of the ongoing route.

![Spoke-network model](image)

Figure 8. Node and hub network of *kerupuk* business trajectory in Kampung Muka.

Pasar Ikan and Pasar Nalo can be called the hub for Sunter *Kerupuk* Factory (hub). Furthermore, Sunter *Kerupuk* Factory can be a hub for *kerupuk* businessman in Kampung Muka (hub). In addition, the house of *kerupuk* business owners in Kampung Muka can also be a hub because of its spread to
shops that are customers to the *kerupuk* (node. Finally, those shops can also be called a hub because they sell *kerupuk* to the area surrounding the shops (node).

- **Node:** *Kerupuk* customer shops and the area surrounding the shops.
- **Hub:** Pasar Ikan, Pasar Nalo, Sunter *Kerupuk* Factory, and houses of *kerupuk* businessman in Kampung Muka

There are two trajectories in general based on the connection between location and location (node and hub) of *kerupuk*, namely:

- **Hub-hub-hub-node:** Pasar Ikan-Pasar Nalo-Sunter *Kerupuk* Factory-*Kerupuk* processing places in Kampung Muka.
- **Hub-node-node:** *Kerupuk* processing places in Kampung Muka-*kerupuk* customer shops-area surrounding shops.

**Figure 9.** Spoke-network model trajectory of *kerupuk*: *kerupuk* factory-*kerupuk* businesses in Kampung Muka.

**Figure 10.** Spoke-network model trajectory of *kerupuk*: *kerupuk* business in Kampung Muka-*customer* shops.
Table 3. Design variables from spoke-network kerupuk trajectory.

| Model Class | Node-Hub   | Inter-Node Relationship | Inter-Hub Relationship |
|-------------|------------|--------------------------|------------------------|
| Figure 9    | Protokol B | Single Hub               | None                   | Partial                |
| Figure 10   | Protokol F | Multiple Hub             | None                   | Partial                |

4. Conclusion
Distribution route of kerupuk trajectory can be a method to interpret a city (Kampung Muka area until North Jakarta). The distribution route trajectory with timeline visualization indicates time, location, and attributes that are interconnected. These three aspects are influenced by the direction of the trajectory towards the desired destination. The trajectory route is based on the direction that can make the trajectory mobility that is active. The active mobility will expand the flow and network of the trajectory. Flow and network can be seen from a trajectory map view to show how far the trajectory radius of kerupuk. The kerupuk’s journey from home business in Kampung Muka has a trajectory radius up to Cilincing and the around surrounding North Jakarta.

Flow and network can also shape the spatial pattern of kerupuk trajectory. Flow can be viewed from the sequence of the kerupuk’s journey, wherein the flow of movement of the kerupuk is indicative of the spatial pattern necessary in the trajectory. The network is represented by the locations that are connected with kerupuk trajectory to indicate the connection between location which are categorized into strong time and weak time. The results show that the kerupuk trajectory includes food travel in a sequential process, namely the kerupuk process which begins with taking kerupuk at the Sunter Kerupuk Factory, wrapping the kerupuk, then distributing it to the kerupuk business subscription shop. Based on the sequence of the kerupuk's journey, it forms a pathway that shows the existence of Kampung Muka in the Kota Jakarta, so that it can be used as a basis in reading the map of Kampung Muka and North Jakarta as the context. From there the kerupuk trajectory has a new spatial pattern.

Thus, urban spatial from kerupuk trajectory is obtained from the strong time location line pattern and the kerupuk trajectory path from direct observation between strong time locations. So that, the results obtained show urban spatial kerupuk trajectory which includes areas that are often crossed by the kerupuk. Based on the urban spatial trajectories of the kerupuk in Kampung Muka business, it can be called a hub. This is because the kerupuk business is carrying out production activities (wrapping the kerupuk) and distribution activities under its own auspices. The kerupuk business is a hub because it already has its own brand that is spread outside the Kampung Muka area, so kerupuk has been known to people around the store and its subscription stores, which are seen from the brand and taste.

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