

Vending machines covered area in Tsukuba: A comparison of distribution behavior in two different areas

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1. Motivation

Japan is the country with more vending machines per capita in the world. In the everyday life, Japanese people get drinks, snacks, cigarettes, alcohol and other items from vending machines as a regular routine. In this study, an analysis about the covered area of the vending machines in two different areas in Tsukuba will be performed.

2. Introduction

As soft drink's vending machines are the most common type of vending machines that can be found in the public road, people who live in Japan are get used to satisfy their will of having a hot or cold soft drink wherever they are within a walking distance. That means that vending machines' covered area is considerably high in Japan.

This report is a case of study of the vending machines covered area in two different busy areas of Tsukuba in order to find tendencies or behaviors about the distribution of the vending machines considering two different scenarios: a) 100 meters cover distance. b) 150 meters cover distance.

3. Study Area

Two different busy areas of Tsukuba:

- 1) The city center area of Tsukuba city, which is the busiest area in Tsukuba, where the train station and many commercial stores and companies are located in.
- 2) The main campus area of the University of Tsukuba, where many students take classes, eat lunch and perform social activities every day.

4. Methodology

The vending machines were tracked by the Arc GIS Collector Application through a mobile phone, creating one point per vending machine and also indicating if it is located indoor or outdoor.

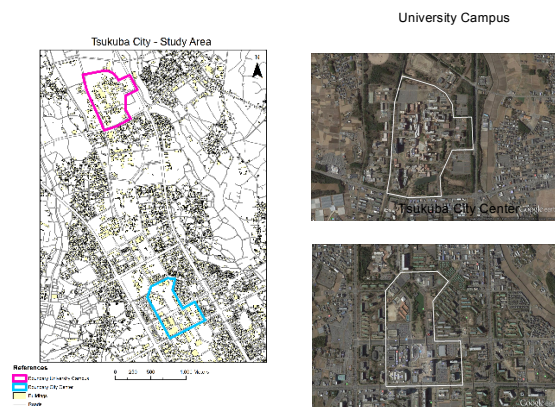
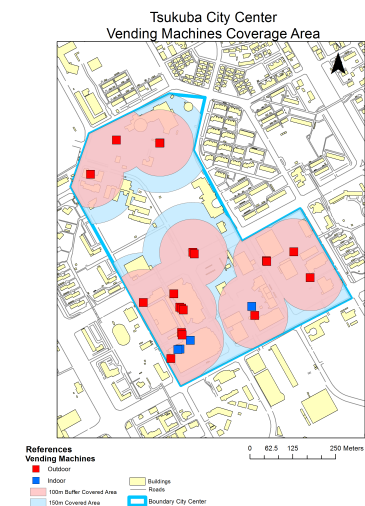
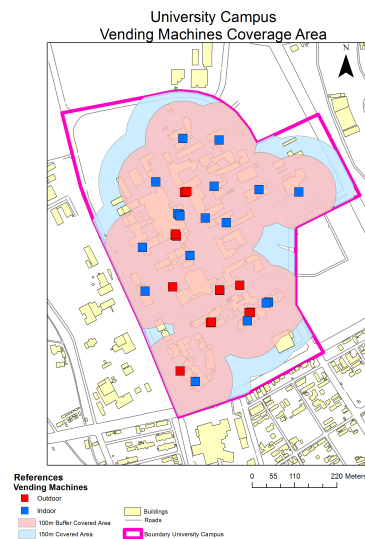
Once all the vending machines were surveyed, a buffer analysis was performed in Arc GIS in order to define the cover area of each machine considering 100 meters and 150 meters as the walking distance limit to reach one.

The final stage was to compare the results of each area analyzing the quantity of vending machines, density

and covered area of the both study area selected.

5. Results and Discussion

At the City Center there is a notorious majority on outdoors vending machines and they are highly concentrated in the commercial area surrounding the train station. However, the density decrease when the distance to the main commercial area becomes bigger. On the other hand, the Campus Area has a more balanced distribution regarding distance and outdoor/indoor locations.



Area	Campus	City Center
Vending Machines	33	23
% VM Indoors	55%	13%
% VM Outdoors	45%	87%
m ² Total Area	393,871	340,762
Density (VM/m ²)	11.935	14.816
% Each 100m Buffer	8%	9%
% Each 150m Buffer	18%	21%
% Total Buffer area (100m)	77.70%	73.74%
% Total Buffer area (150m)	95.43%	95.31%
% Buildings covered area	20.27%	22.57%