FlexMarket

A Transient Mode of Local Exchange

by Jennifer Dunnam

B.F.A. Design
University of Texas at Austin, 2007

B.A. Studio Art
University of Texas at Austin, 2007

Submitted to the Department of Architecture
in partial fulfillment of the requirements for the degree of
Master of Architecture at the Massachusetts Institute of Technology
February 2012

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Abstract
This thesis presents the idea of a networked, transient mode of local food exchange and proposes a responsive infrastructure for integrating dynamic markets within the urban fabric. Focusing on market typologies as an area for critical intervention, I propose a design strategy whereby vendors are liberated from regulated market schedules and retail locations, and mobilized to operate as independent distributors informed by real-time supply and demand fluctuations. A research study is presented on early European traders, modern location theories, and contemporary supply chain logistics in order to contextualize the proposition within a historically evolving spatial relationship between producers and consumers. Using social, environmental, and economic lenses, I assess the benefits of a transient food market for South Tyrol, Italy, a region with a long tradition of agricultural production but where modern advances in technology provide significant advantages for exporting products rather than selling locally. The design research and proposal is presented as four distinct ideas that articulate the emerging role of the 1) producer, 2) products, 3) people, and 4) places within a digitally connected and socially networked environment. The convergence of these ideas establishes the critical design project, which is formalized and tested through a series of future projections that speculate on the spatial evolution of cities as people become increasingly connected and guided within an urban operating system.

Topics discussed within this thesis include responsive “plug in” infrastructures, networked people and products, real-time data mining and analysis, and urban operating systems inspired by theories and applications of architectural cybernetics.

Thesis Supervisor: Carlo Ratti PhD
Title: Associate Professor of the Practice
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To Carlo, Assaf and all members of the Senseable City Lab, thank you for making my time at MIT a true intellectual adventure.

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To Daniel, thank you for encouraging me, inspiring me, and always challenging me to go further with my ideas.

Contents

Statement of the Problem
Food & the City 6

Background of the Problem
Spatial Issues of Food Exchange 10

Description of the Site
South Tyrol, Italy 16

System Proposal
A Real-Time Communication Platform 38

Design Proposal
Mobilize Producers 44
Connect People 48
Network Products 52
Activate Places 58

Final Thesis Defense
December 15, 2011 70

Bibliography 76
The past decade has seen a sharp increase in demand for locally grown, organic products. News of obesity rates, contamination outbreaks, and poor livestock conditions have led many to reexamine their food sources and consider alternative places to buy products beyond the supermarket and fast food retailers. Grassroots efforts have risen to combat such trends, most notably the “Slow Food Movement” which first surfaced in Italy as resistance to a McDonalds opening near the Spanish Steps in Rome. Groundbreaking documentaries such as “Fast Food Nation” and “Food, Inc.” offer a focused look at the crisis by exposing the social, economic, and environmental factors that have driven the shift from small-scale agriculture to mono-cropping practices requiring extensive supply-chain logistics. With communities eager to support local farming and affordable food options, there has been a growing interest in the farmers’ market as a means for interfacing with local producers and purchasing fresh, affordable organic products. Although the number of market patrons is on the rise, local vendors continuously struggle to maintain a competitive advantage over supermarket retailers that offer fast, convenient, and consistent food services. The limitations of current farmers’ markets can be attributed to limited schedules and locations, and variable supply and demand throughout the year. Existing spatial, social, and economic structures create an environment more hospitable to export distribution strategies and supermarket retailers. As cities continue to grow in size and complexity with their boundaries persistently pushing outward, there arises an urgency to provide more sustainable methods for small, local producers to distribute their products in an efficient, affordable way.

The challenges associated with infrastructures of local food exchange are most readily seen within the issues of accessibility and adaptability. In South Tyrol, a northern region of Italy, the patterns of activity related to food throughout the year show considerable fluctuations occurring around supply and demand (see Table 1). During harvest season, demand for farm labor rises drastically only to drop away almost entirely during the winter months\(^1\). Also of importance is the presence of tourists who create a huge surge in interest for local products but for a very limited amount of time\(^2\). The region of South Tyrol aims to promote local culture through an abundance of outdoor concerts and festivals but these events depend on a surplus of resources and collaboration across several industries in the area. On a daily scale, the demand for food at meal times is significant for local businesses which need to be prepared with the appropriate resources to accommodate spontaneous demand (see Table 2). The problem with this dynamic culture of food is that existing infrastructures for food exchange are static. Supermarkets have the same store hours and locations throughout the year despite supply and demand variations. Farmers’ markets have a little more adaptability and producers rely on these outlets for selling off their surplus during harvest season. One a daily scale, the markets aren’t readily available for meal-time customers.

\(^1\) L. Oswald, B. Meroder. South Tyrol’s Economy: It’s Structure and Specific Features. Chamber of Commerce, Industry, Crafts, and Agriculture of Bolzano, 2006

\(^2\) B. Prugger and A. Zuegg, Sudtirol in Zahlen. SMG, 2009
An investigation into food exchange requires a look at the historically evolving spatial relationship between producers and consumers. The following chapter outlines three typologies of food exchange that offer insight into how society has been shaped by food, and how society has redefined the spatial dispersal of food production. The first typology, *transient locations of exchange*, describes the benefits of mobility as it allows for continuous adaptation alongside supply and demand fluctuations as well as urban dynamics. The second typology, *fixed locations of exchange*, outlines the importance of addressing distance limitations when determining ideal exchange positions. The final typology, *networked locations of exchange*, addresses the significant advantage of increasing communication between producers and consumers.

### Transient Locations of Exchange

**Fixed Locations of Exchange**

**Networked Locations of Exchange**

Food markets and street vendors have existed since the earliest town settlements were formed, however, the spatial relationship between producers and consumers has seen significant transformation throughout history (due to innovations in packaging, transportation, and communication). Before markets were designated as formal exchange points in the city, trade existed as a transient mode of distribution. Early civilizations gained access to distant products through nomadic traders called pedlars. The earliest record of peddling dates to the 15th century where mountainous regions along the Alpine curve saw numerous populations settling around trade routes and pedlars would service the high altitude villages that ran from the Savoy region to the Tyrol. Despite the seemingly autonomous nature of the pedlar’s work, the traveling vendor would operate within tight communal networks made up of family relatives collaborating around production, processing, and distribution. Another version of the mobile vendor network was found in the migratory movement, which would designate pedlars to seek out business and trading opportunities ahead of the masses. The distinguishing feature of these transient businesses was their adaptability. Mobile vendors were eager to accommodate new settlements by adjusting their routes and increasing supply. The network around the pedlars also served as a communication platform by which vendors could share information on populated areas and farmers could collect details about which products were selling best. Seasonality was also an important factor that determined the vendor distribution strategy. The impermanence of the pedlar operation allowed producers to adjust their number of distributors as supply fluctuated and harvest time required more on-site workers.

1 L. Fontaine. History of Pedlars in Europe. Duke University, 1996, pg 8-12
As societies further established themselves and city centers began to grow, there emerged a number of theories for how urban space and agricultural land might coexist in service of one another. The popular sentiment among economists and town planners was that rising populations and expanding boundaries required locations for food exchange to become increasingly centralized and regulated. In 1826, German economist Johann Heinrich von Thuenen put forth a hypothesis that described a series of agricultural ‘rings’ around the city that would reflect land rent and land use¹. Thuenen argued that, due to transportation limitations and production demands, products requiring immediate delivery to patrons would be grown closest to the city while livestock, which could walk itself into the city before being slaughtered, could occupy the outermost ring. This spatial relationship also acknowledged that livestock grazing would require a substantial amount of land and should therefore be reserved for the cheapest, most outer regions. The designation of a central space for the ‘farmers’ market’ soon took place whereby regional producers would bring products into the city center on designated days and local communities could find a lively scene on the city streets with products from all over². While the Von Thuenen Model hypothesized about how agriculture would develop around a city, Central Place Theory aimed to explain where a city center would emerge and why. The theory, initiated by Walter Christaller in 1933, argued that settlements are simply “central places providing services to surrounding areas” and their number, size and location are part of a self-organizing urban system³. Within the spatial diagram, Christaller identified the ‘threshold’ as the size of population required for adequate consumption and the “range” as the maximum distance people would be willing to travel for purchasing the product. Central Place Theory was later met with criticism, as it did not readily acknowledge the diversity of products offered or the temporal aspect of urban development. In some ways, however, Central Place Theory is an appropriate model for the way many farmers’ markets and supermarkets operate today. Farmers’ markets are often initiated by local communities who find that fresh, organic produce is limited and therefore request a weekly market to serve them. Once the community boundaries extend the “range” as termed by Christaller, another farmers’ market will need to be established in order to maintain equilibrium. Supermarket locations are determined through demographic studies that identify underserved areas. The large scale and diversity of products offered at supermarkets extends the “range” parameter within Christaller’s model since people are willing to travel further distances if the shopping tasks are consolidated into one location. Patrons of farmers’ markets typical shop 2-3 times a week whereas supermarket customers reduce their visits to only once a week⁴.

Following the industrial revolution, there was a dramatic transformation in the way food was distributed. Advances in transportation and packaging (refrigeration) suddenly allowed food to be carried long distances causing agricultural production to be pushed further to the periphery of cities. Communication technologies emerging from the digital revolution generated yet another transformation in food exchange whereby distribution could be broken down into steps (i.e. supply chain) offering many producers the freedom to sell items at wholesale and no longer serve the individual consumer. This distribution strategy has created a landscape consisting of networked locations of exchange that communicate across regions in order to efficiently balance supply with demand. One of the most successful examples of the networked market typology is Walmart whose online format notifies supplies within seconds of an item’s purchase. There are significant benefits to this kind of real-time communication, one of which is the ability for a producer to track the success of their products and immediately respond to demand by sending additional supply. Customers aren’t concerned with seasonal harvest fluctuations or geographic limitations because if one supplier can’t deliver, than another can be found to replace them. Supply chain logistics also offer reduced costs on some items, although environmental costs are arguably much higher due to the extensive transportation involved. Despite the perceived benefits of the supermarket typology, the culture around food exchange is largely lost in such an environment. Food that was once local and seasonal is now shrink-wrapped and sanitized with only a label to communicate its contents. The interaction between consumers and farmers is lost and only final purchases are registered and transmitted back to the producer. Customers interested in buying their weekly groceries must now visit huge warehouse structures and navigate endless aisles of products. As a culture, we have pushed all traces of food cultivation to the boundaries of our life and so much has been lost in the process.
South Tyrol is a region in northern Italy that offers a unique landscape of alpine mountains and Mediterranean valleys. The area comprises nearly 7,400 square km, yet only 8% of the terrain is habitable. Nearly half a million people live in the area and there are over 25,000 farmsteads currently operating, the majority of which are family run. Despite this long tradition of agricultural production, there have been considerable increases in exportation of products which threatens South Tyrol’s local food culture.

In the Spring of 2010, TIS Innovation Park in South Tyrol agreed to work with a team from MIT’s Senseable City Lab in order to develop new strategies for connecting local producers and consumers while enhancing the experience of shopping for local products. This chapter outlines the figures associated with South Tyrol’s “food landscape” as well as the results of a site investigation focusing on the operation of farmers’ markets, local businesses, and tourism. The critical design project for this thesis was built upon the results of this initial research partnership.

MIT Senseable City Lab

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Assaf Biderman, Associate Director
Jennifer Dunnam, Project Leader
Fabien Girardin
Kristian Kloeckl
Diego Manilloff
Bernd Resch
Anthony Vanky

Made Possible By
population distribution

482,650 people
65 inhabitants per square km
116 municipalities
8 major villages

farm distribution

25,000 farmsteads
17,000 agricultural businesses
21,000 Farmers’ Union members

regional terrain

74,000 square km
8% habitable land

transport network

roadways
major highway exits
railways
train stations
airports

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
Bolzano, Italy is the largest city in South Tyrol with around 100,000 residents. This dense urban area serves as the central exchange point for many people and the following pages present various types of exchange operations found in this region.

<table>
<thead>
<tr>
<th>Minimal Operation</th>
<th>Established Operation</th>
<th>Advanced Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td><strong>Benefits</strong></td>
<td><strong>Benefits</strong></td>
</tr>
<tr>
<td>easy make-shift stands</td>
<td>personalized operation</td>
<td>foldable, serviced truck</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td><strong>Limitations</strong></td>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td>lacks identity</td>
<td>significant assembly required</td>
<td>expensive vehicle</td>
</tr>
<tr>
<td>struggles to accommodate customers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
There are several farmers’ markets within Bolzano, but each employs a unique strategy for occupying urban space and serving customers. A closer look at three markets reveals the diversity of producers, products, and people within this region.
vehicles used as storage

food trucks serving customers along the market street

trucks converted for market use

detachable awnings on vendor trucks
FlexMarket: A Transient Mode of Local Exchange

Tuesday Market

small market assembly of six vendors

market stands customized by signage and products

vehicles serve as overflow storage
Daily Market

permanent street market serves both imported and exported items

located on a popular pedestrian street with many tourists

limited space requires external storage
In order to better understand the process by which people, products, and producers come together in local farmers’ markets, a site investigation was undertaken to assess both the qualitative and quantitative factors driving food exchange in South Tyrol. A team of researchers from MIT’s Senseable City Lab traveled to Italy in the Spring of 2010 to meet with local producers and learn more about their businesses. For 5 weeks, we monitored their movements using GPS trackers and identified many inefficiencies within their routes that could be drastically improved using simple optimization tools. In addition to tracking producers, our team also visited ten farmers’ markets throughout South Tyrol and collected information about how far people travel to participate in the markets and their motivations behind shopping and selling in these spaces. Our final step towards understanding the dynamics of South Tyrol activity involved data mining the open source photo-sharing platform, Flickr. By plotting over 200,000 geotagged photos anonymously uploaded to Flickr, we were able to view an entire year’s worth of activity showing significant changes in interest alongside the seasons.
interviewing farmers
surveying markets

Sample from Customer Survey

<table>
<thead>
<tr>
<th>Name of the Vendor</th>
<th>Price per Unit</th>
<th>What is your company/supplier?</th>
<th>What is your best-selling item?</th>
<th>How often do you purchase from the market?</th>
<th>How does your company/supplier help you with your purchase?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beacon Hill Foods</td>
<td>$2.99</td>
<td>Produce</td>
<td>Tomatoes</td>
<td>2-3 times a week</td>
<td>Fresh, locally grown</td>
</tr>
<tr>
<td>Greenhouse Market</td>
<td>$1.99</td>
<td>Vegetables</td>
<td>Spinach</td>
<td>4 times a month</td>
<td>Organic, seasonal</td>
</tr>
<tr>
<td>Country Kitchen</td>
<td>$3.99</td>
<td>Meats</td>
<td>Beef</td>
<td>1 time a month</td>
<td>Grass-fed, humanely raised</td>
</tr>
<tr>
<td>River Runn Restaurant</td>
<td>$2.50</td>
<td>Beverages</td>
<td>Coffee</td>
<td>3 times a week</td>
<td>Fair-trade, locally roasted</td>
</tr>
<tr>
<td>Fresh World Market</td>
<td>$1.49</td>
<td>Eggs</td>
<td>Chicken eggs</td>
<td>5 times a month</td>
<td>Free-range, pastured</td>
</tr>
<tr>
<td>City Greens Farm</td>
<td>$2.19</td>
<td>Fruits</td>
<td>Apricots</td>
<td>2 times a week</td>
<td>Organic, tree-ripened</td>
</tr>
<tr>
<td>Harvest Fresh</td>
<td>$3.29</td>
<td>Produce</td>
<td>Blueberries</td>
<td>1 time a month</td>
<td>Locally grown, fresh</td>
</tr>
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</table>

Sample from Vendor Survey

<table>
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<tr>
<th>Name of the Vendor</th>
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<td>$2.50</td>
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</tr>
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34 FlexMarket: A Transient Mode of Local Exchange

Jennifer Dunnam, Massachusetts Institute of Technology, 2012 35
The system for FlexMarket is designed as a real-time communication platform that negotiates between producers and their customers.

Producers
A producer is networked among his peers and can access the system using a mobile smart device. Using the GPS feature of the smart device, the vendor’s location is continuously made available to the public. In addition to sharing his location, the producer can also post updates about his products, particular sales he’s offering, delivery services, and upcoming market stops. The producer can monitor updates from other vendors in order to decipher more efficient strategies for selling his products.

Customers
Customers access the system using a smart device or personal computer. From the smart device, location identification is possible if the user chooses to share this information. The customer is able to search through real-time data to find nearby vendors, food events, and market sales. The customer can also browse recommendations from other customers and query the database for details about the products and agricultural practices.

City
The city has access to information generated by the FlexMarket system which enables city officials to make better decisions on when to close off streets, where to invest in infrastructure development, how to support local producers, and how to better accommodate seasonal tourism.
### Functionalities of the System

**For Vendors**
- Broadcast real-time location online.
- Post product availability online.
- Post promotions & announcements online.
- Receive customer requests through online interface.
- Engage network of regional producers and food to advance vending strategies, customer service, and promotional activities.
- Access open data sets to increase awareness of regional activities and customer interests.

**For Customers**
- View vendor’s location online.
- View vendor’s products online.
- View vendor’s promotions & announcements online.
- Request deliveries through online interface.
- Receive delivery confirmation through online interface.
- Create personalized maps according to food interests.
- Access open data sets on regional activities.

### Technology Behind the System

**Front End**
- Smart Device (phone or tablet) with integrated GPS
- Smart Device Holder
- Smart Device Charger
- SIM Card

**Back End**
- Server

**Software**
- SIM Card Data Plan
- Website Interface
  - General Information
  - Vendor Profile
  - News Feed
  - Real-Time Map
  - User Profile (for customers)
  - Internet of Food Interface
    - Search Inquiries
    - Customized Maps
    - Information, Reviews, Etc
- Smart Device Applications
  - (same features as website)
The design proposal for FlexMarket is divided into four sections that each address a critical component within the system of food exchange. The first section, Mobilize Producers, describes the various inefficiencies found in current distribution processes and outlines the opportunities for optimizing sales through real-time communication. Mobility is a critical success factor for any South Tyrolean producer and the FlexMarket proposal builds upon this element by enabling a greater flexibility in planning one’s route. The second section, Connect People, looks at current open-source data sets available within South Tyrol and argues that by tapping into this information, greater connections can be made between the interests of people and the places and products they’re seeking. A map of geo-tagged Flickr photos is presented across four seasons to offer insight into how seasonality affects the movement of tourists and suggests that producers might reconsider their market locations throughout the year. The third section, Network Products, presents the idea of building a “food network” based on complimentary items. Several ideas for applications are outlined to reveal the potential behind a radical transparency of products. The last section, Activate Places, presents the physical manifestation of the FlexMarket system upon an urban fabric. A proposal for a shared vehicle program is outlined including a smart charging infrastructure that monitors the vehicle fleet. This final idea serves as a future scenario for how networked food exchange would evolve and transform the way we interact with producers and experience food within the city.
mobilize producers

mobility is critical for regional producers

locals rarely shop at markets beyond their neighborhood

farmers markets — major roadways

farm distribution

- 0 %
- 1-9 %
- 10-29 %
- 31-74 %

70% of vendors travel more than 40 km to markets

85% of customers only visit their neighborhood market
vendors travel past many underserved villages on their way to markets

population of areas traveled during route to market: 164,349
Source: Autonomous Province of South Tyrol Provincial Statistics Institute - ASTAT Bozen / Bolzano 2006

time: 1 hr 26 min
distance: 105 km
competition: 10 bread vendors
market hours: 6 hrs

new route for vendors using the FlexMarket system

sankt georgen farm
location: harasser product: bread

meran market (friday)
time: 1 hr 26 min
distance: 105 km
competition: 10 bread vendors
market hours: 6 hrs

ambulante routes are inefficient and service is often inconsistent

vehicle speed during 'ambulante' route

steiner butchery may 12 route

meran market

steiner butchery

meran market

steiner spent 7 hours selling bread making almost 50 stops for a village of only 700 people

customers can visit the market directly on foot

customers can request deliveries to their home (even when they’re away)

new route using the FlexMarket system

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
connect people

real-time conditions

social media

mobility networks

trip planning

people are using technology to connect in new ways

open source data sets can be accessed for further insight into people’s activities and interests

data sets from different sources can be combined to generate personalized maps and suggestions for how to experience south tyrol
south tyrol is active throughout the year with each season bringing new activities

winter
dispersed activity throughout the region with clustering around ski areas and dolmites

summer
loose clustering of people around natural landscapes

fall
scattered activity in eastern region with high concentration in cities

spring
lesser activity throughout region but significant crowds concentrating in urban areas
network products

local products are often difficult to find within busy markets

Excerpt from “Flavor network and the principles of food pairing” by Yong-Yeol Ahn, Sebastian E. Ahnert, James P. Bagrow, Albert-Laszlo Barabasi

Relationships among food items can be mapped within a network according to their favorability to one another. These food networks can be used to better determine market arrangements as well as optimize search queries for complimentary products.

FlexMarket puts local vendors at an advantage by streaming their products, sales, and events in real time

Excerpt from “Flavor network and the principles of food pairing” by Yong-Yeol Ahn, Sebastian E. Ahnert, James P. Bagrow, Albert-Laszlo Barabasi

Relationships among food items can be mapped within a network according to their favorability to one another. These food networks can be used to better determine market arrangements as well as optimize search queries for complimentary products.
the network of food forms connections among complementary products

70% of vendors sell only one type of product

supply and demand fluctuations can be tracked in real-time and used to make decisions on where to shop and sell

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
FlexMarket helps customers navigate a landscape of food

Option 1: travel to markets to sell alongside competitors.

Option 2: coordinate sales with vendors offering complementary products.

Markets with significant numbers of wine vendors:
- Weingut Steinhauserhof
- Location: Salurn
- Product: Wine

Fruit vendors
Cheese vendors
Meat vendors

FlexMarket: A Transient Mode of Local Exchange
Jennifer Dunnam, Massachusetts Institute of Technology, 2012
activate places

illegal street sales
counterfeit merchandise / new york city

roaming carts in public spaces
lemonade cart / boston

food truck parking
solar food truck / austin

weekly market stand clusters
farmers market / los angeles

established market district
les halles / paris

ephemerical

permanent

integrated market support infrastructure

permanent market structure

visserijplein plaza / rotterdam

santa caterina / barcelona

the scale and temporality of markets in the city...

two persistent spatial problems of markets
1. vendors are restricted to designated parking locations
2. markets require advanced approval from city to occupy streets

FlexMarket enables real time communication with the urban infrastructure

where can i set up my market stand?

which streets should close for markets?

producer
city officials

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
the physical manifestation of FlexMarket involves three essential parts

1. interactive charging infrastructure
2. self-organizing clusters
3. customizable vending units

In order to “activate places”, the FlexMarket proposal includes a business strategy for launching a shared vehicle program controlled by a smart charging infrastructure. The vehicles, called FlexPods, are small vending units that can be customized by producers and easily unfolded to display products at markets. The charging infrastructure, called a FlexPad, contains an array of sensors that monitor the location and identity of vending units and allow users to easily navigate large market clusters. The FlexMarket system is designed to offer parking assistant to vendors so that street markets may grow according to a general logic that can be easily navigated by customers. A “place making configuration library” is utilized to offer vendors suggestions for how to set up their vehicles alongside one another and form market stands that are welcoming to browsing customers.
2 self-organizing clusters

decision tree

The vendor approaches an area and the system asks for one response...

- would you like vending location assistance?
  - yes
    - access vendor distribution map
    - access regional activities and population distribution map
    - highlight spaces available around and within the cluster
    - highlight the “preferred direction” of the cluster
    - highlight complimentary vendors
  - no
    - access urban condition map
    - are other vending units present?
    - access local configuration strategies
    - highlight spaces available around and within the cluster
    - highlight the “preferred direction” of the cluster
    - highlight complimentary vendors

- monitor unit and register location
  - no
    - access global configuration strategies
    - highlight spaces available around and within the cluster
    - highlight complimentary vendors
Would you like vending location assistance?

- No
- Yes

- Access global configuration strategies
  - Highlight complimentary vendors
  - Highlight spaces available
  - Highlight the "preferred direction" of the cluster

- Access regional activities and population distribution map

Are other vending units present?

- No
- Yes

- Access urban condition map
  - Highlight complimentary vendors
  - Highlight spaces available
  - Highlight the "preferred direction" of the cluster

Is the location "constrained"?

- No
- Yes

- Highlight spaces available around and within the cluster
  - Highlight the "preferred direction" of the cluster
  - Highlight complimentary vendors

Access local configuration strategies

Highlight complimentary vendors

Highlight spaces available near the "anchor points"
the farmers union owns and maintains the FlexPods

vendors rent the FlexPods for weekly or seasonal time periods

producers customize the FlexPods according to their needs

meat & cheese
refrigeration

wine
wooden racks

produce
display shelves

3 customizable vending units

customizable vending units

Cluster Anchors

- crowds
- green spaces
- parking areas
- tourist destinations
- charging areas
- market clusters

cluster "anchors" are identified throughout the city as points of interest where the growing market might be steered towards

the city invests in a charging infrastructure for electric vehicles and FlexPods are the initial fleet of vehicles to be supported

Jennifer Dunnam, Massachusetts Institute of Technology, 2012
FlexPod can be independently driven or pulled by another vehicle for long distances.

FlexPod can expand for additional storage and space.

Shelves can slide out and rotate to reconfigure the space around FlexPod.
renderings of market clusters

model of market cluster on street corner
mobilize producers

- mobility is critical for regional producers
- vendors travel past many underserved villages on their way to markets
- ambulante routes are inefficient and service is often inconsistent

connect people

- people are using technology to connect in new ways
- FlexMarket puts local vendors at an advantage by streaming their products, sales, and events in real time
- data sets from different sources can be combined to generate personalized maps and suggestions for how to experience south tyrol
- south tyrol is active throughout the year with each season bringing new activities

network products

- local products are often difficult to find within busy markets
- the network of food forms connections among complementary products
- FlexMarket helps customers navigate a landscape of food
activate places

the scale and temporality of markets in the city...

1. Interactive charging infrastructure
2. Self-organizing clusters
3. Customizable vending units

FlexMarket enables real-time communication with the urban infrastructure.
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