FlexMarket

A Transient Mode of Local Exchange

by Jennifer Dunnam

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

B.A. Studio Art
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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
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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

Acknowledgments

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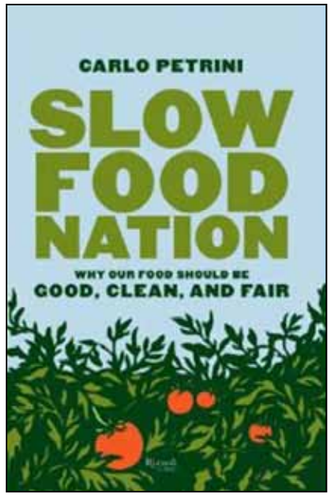
To Daniel, thank you for encouraging me, inspiring me, and always challenging me to go further with my ideas.

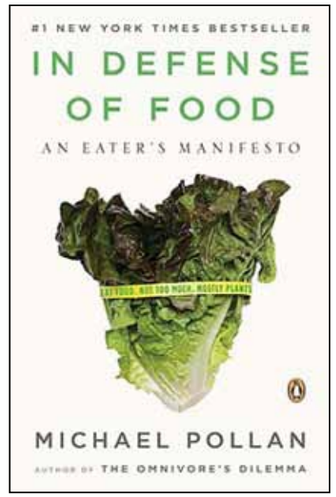
Contents

1 Statement of the Problem
Food & the City

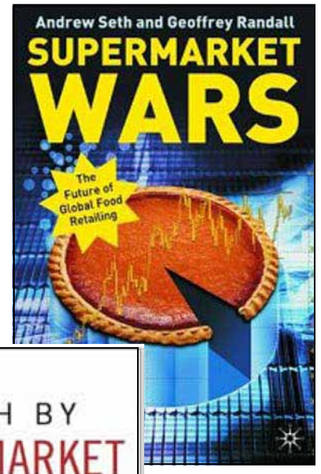
The past decade has seen a sharp increase in demand for locally grown, organic products. News of obesity rates, contamination outbreaks, and poor livestock conditions have led many to reexamine their food sources and consider alternative places to buy products beyond the supermarket and fast food retailers[1]. Grassroots efforts have risen to combat such trends, most notably the "Slow Food Movement" which first surfaced in Italy as resistence to a McDonalds opening near the Spanish Steps in Rome[2]. 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[3]. 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.

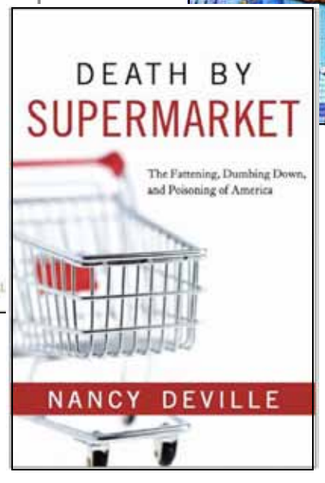
1 Lohr, S. Low, and C. Newman, Local Food Systems: Concepts, Impacts, and Issues, Economic Research Report Number 97. United States Department of Agriculture. May 2010
2 G. Andrews, "The Slow Food Story: Politics and Pleasure". 2008: London, Pluto Press
3 K. Severson. "Eat, Drink, Think, Change." The New York Times. June 3, 2009

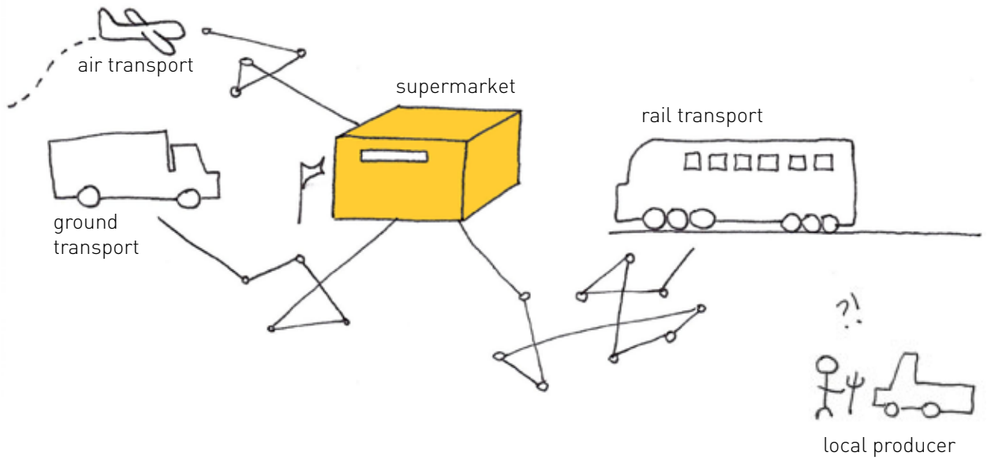




slow food interest in
a fast world economy





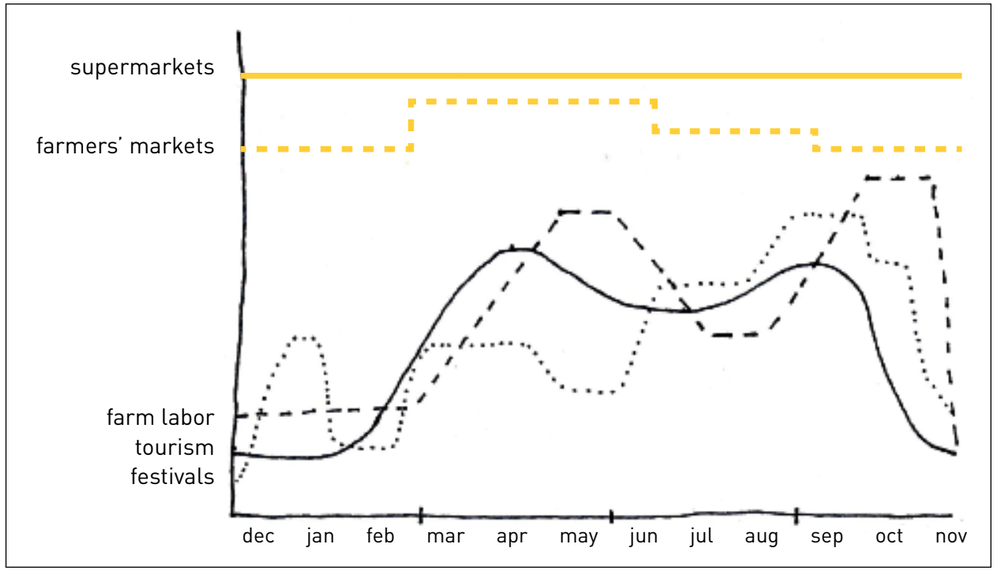


Supply and demand are dynamic, yet existing infrastructures are static.

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 flucations occuring 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.

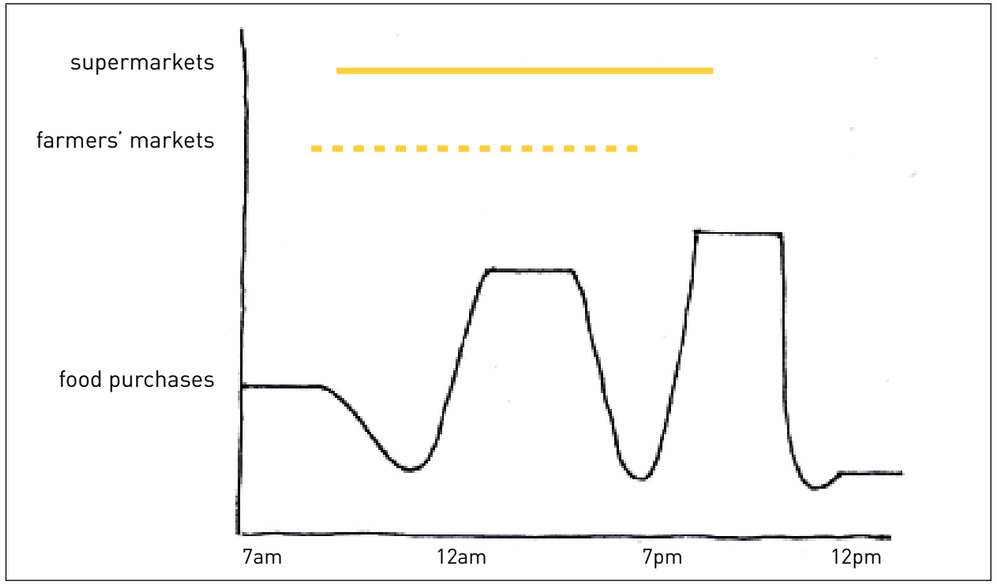
1 L. Oswald, B. Moroder. South Tyrol's Economy: It's Structure and Specific Features. Chamber of Commerce, Industry, Crafts, and Agriculture of Bolzano, 2006
2 B. Prugger and A. Zuegg, Sudtirol in Zahlen. SMG, 2009

table 1: **yearly activity flux**



estimation from the provincial statistics institute

table 2: **daily activity flux**

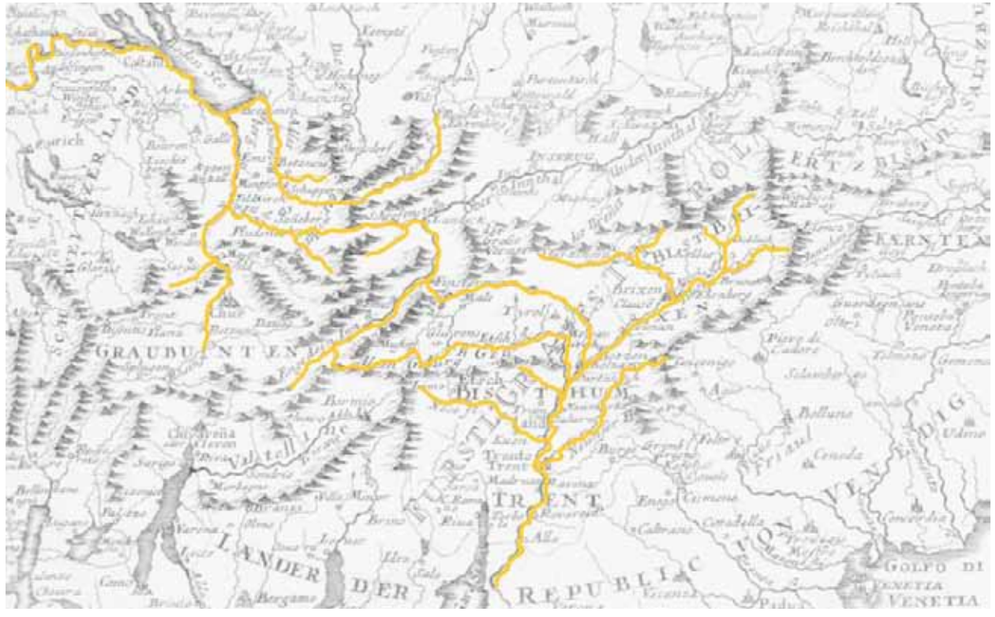


general estimation

2 Background of the Problem
Spatial Issues of Food Exchange

introduction

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.



A map of the Tyrols in 1800 showing the major trade routes (in yellow).

Transient Locations of Exchange
Fixed Locations of Exchange
Networked Locations of Exchange

transient 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[1]. 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.

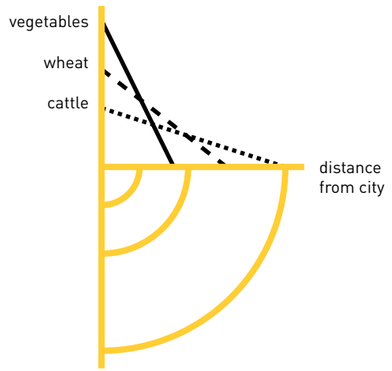
1 L. Fontaine. History of Pedlars in Europe. Duke Univeristy, 1996, pg 8-12

fixed locations of exchange

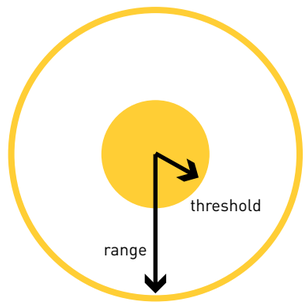
As societies further established themselves and city centers began to grow, there emerged a number of theories for how urban space and agricultural land might coexist in service of one another. The popular sentiment among economists and town planners was that rising populations and expanding boundaries 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 use[1]. 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 over[2]. 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 system[3]. 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 famers' markets typical shop 2-3 times a week whereas supermarket customers reduce their visits to only once a week[4].

1 M. Fujita, P. Krugman, and A Venables. The Spatial Economy: Cities, Regions, and International Trade. MIT Press. 1999
2 C. Steel. Hungry City: How Food Shapes Our Lives. Random House UK. 2008
3 B. Goodall. The Penguin Dictionary of Human Geography. London: Penguin, 1987
4 Scarpellini, Emanuela. Shopping American-Style: The Arrival of the Supermarket in Postware Italy. Enterprise & Society, Vol. 5 No. 4, Business History Conference 2004

Farmers Market in Bolzano, Italy / 1901



Von Thunen Model / 1826

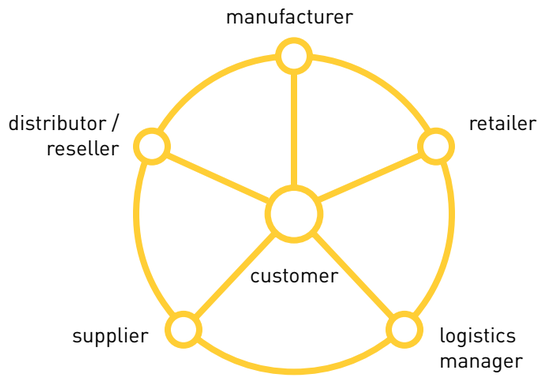


Central Place Theory / 1933

networked locations of exchange

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 whole sale 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.

Walmart Distribution Truck / 2010



3 Description of the Site
South Tyrol, Italy

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.

research partnership

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.

Senseable City Lab Team
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Jennifer Dunnam, Project Leader
Fabien Girardin
Kristian Kloeckl
Diego Maniloff
Bernd Resch
Anthony Vanky

Made Possible By

TIS innovation park

gefördert von Stiftung Südtiroler Sparkasse Fondazione Cassa di Risparmio sostenuto da

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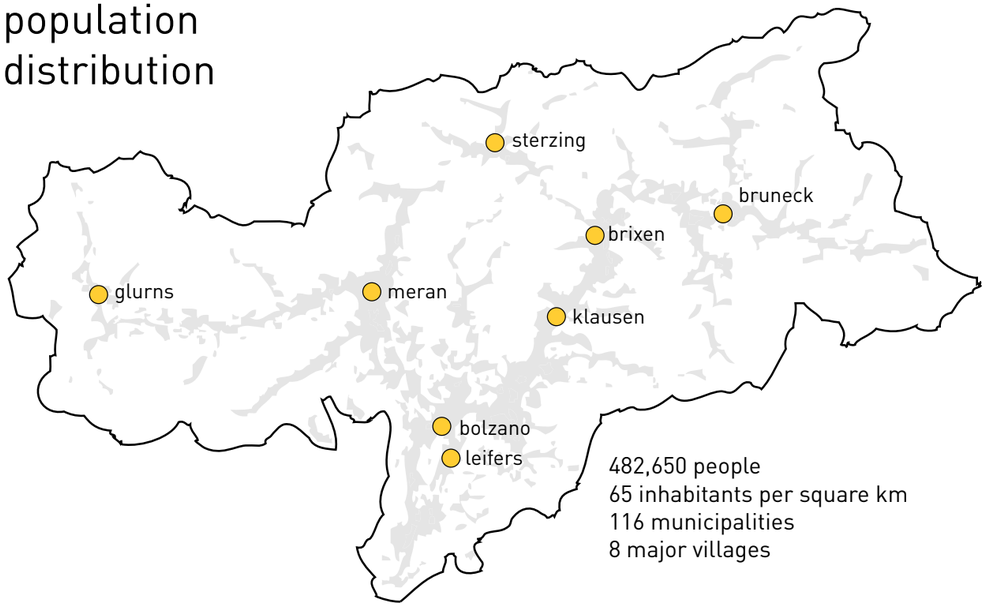
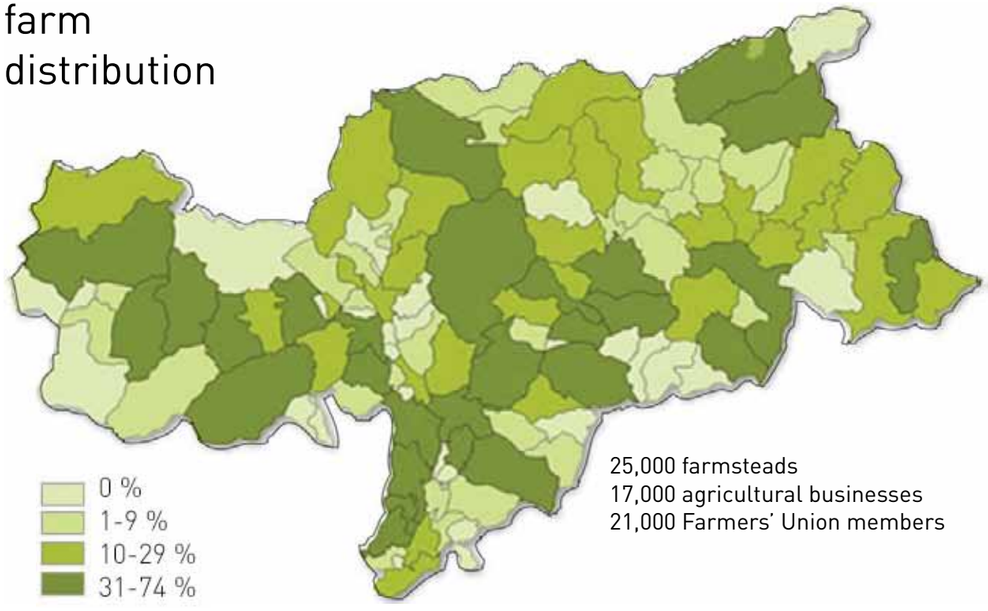
Beratung und Beteiligung

population distribution



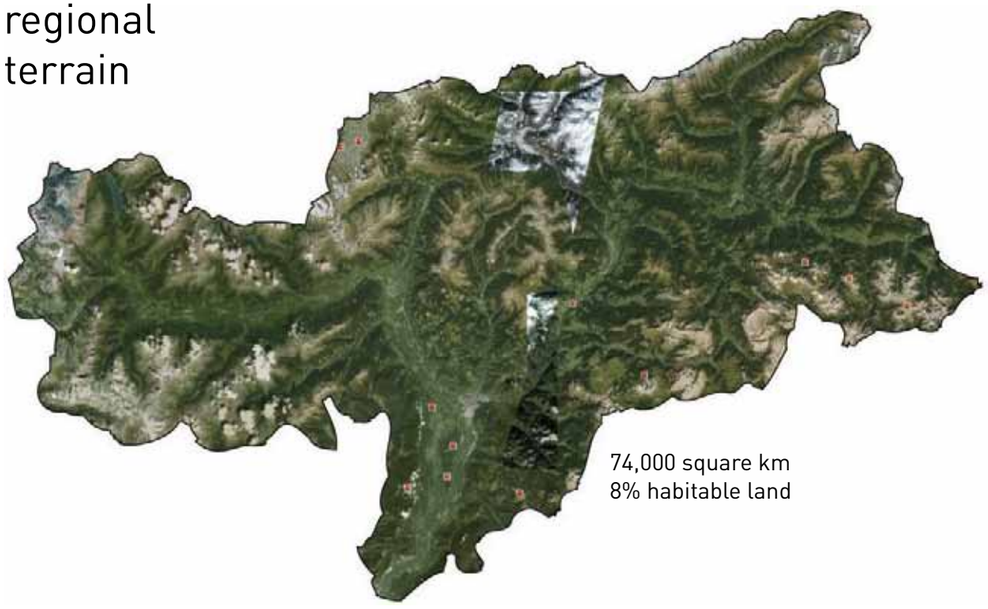
482,650 people
65 inhabitants per square km
116 municipalities
8 major villages

farm distribution



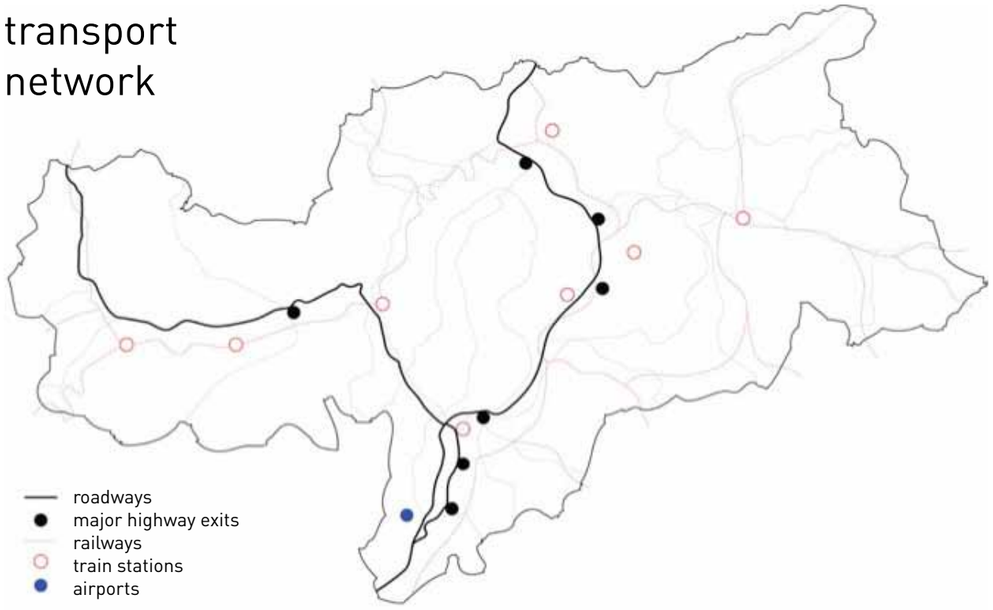
25,000 farmsteads
17,000 agricultural businesses
21,000 Farmers' Union members

regional terrain



74,000 square km
8% habitable land

transport network



map of bolzano

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.

supermarkets

farmers' markets

three types of operations within the farmers' markets

Minimal Operation
Benefits
easy make-shift stands

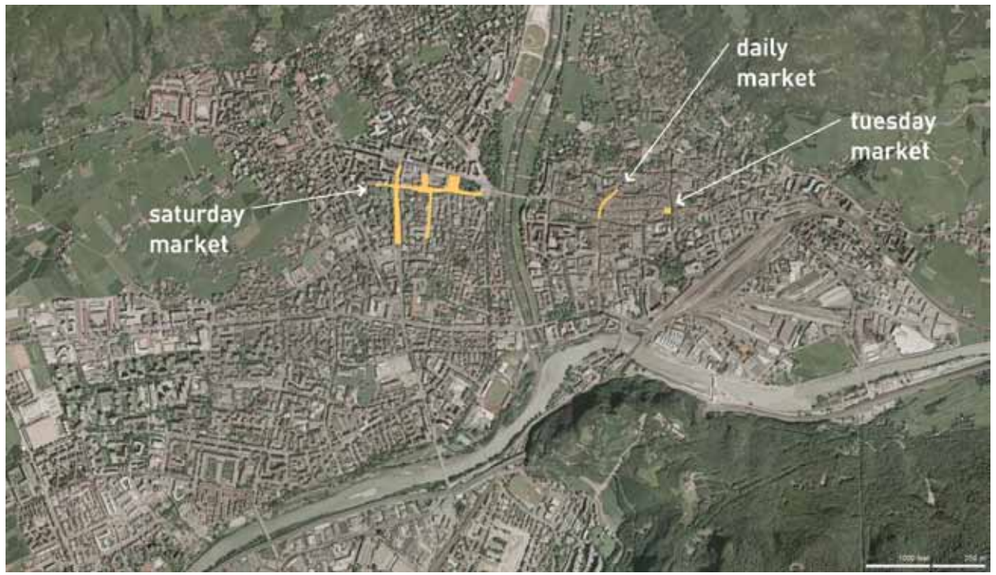
Limitations
lacks identity
struggles to accommodate customers

Established Operation
Benefits
personalized operation

Limitations
significant assembly required

Advanced Operation
Benefits
foldable, serviced truck

Limitations
expensive vehicle



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.

Saturday Market

linear
circulation

vehicles used
as storage

trucks converted
for market use

food trucks serving
customers along
the market street

detachable awnings
on vendor trucks

Tuesday Market

market stands customized by signage and products

small market assembly of six vendors

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

Data Collection Process

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.

tracking producers

Biokistl

Tracking Days
March 28
April 19, 20
March 24, 25, 29, 30
April 11, 19, 20

Longest Distance Traveled
93 km

Deliveries
homes
schools
businesses
specialty markets

Krauterschlossl

March 24, 26, 29
April 2, 3, 7, 8, 11, 12, 15, 16, 17,
18, 20, 27
May 2, 3, 4, 6, 7, 9, 13, 14, 15, 16,
17, 18, 23

Longest Distance Traveled
130 km

Deliveries
hotels
businesses
specialty markets

Meinbeck

Tracking Days
March 24, 25, 26, 28, 29, 30, 31
April 1, 2, 3, 6, 7, 8, 9, 11, 12, 13,
28, 29, 30
May 2, 5, 7, 8, 10, 11

Longest Distance Traveled
32 km

Deliveries
farmers markets
businesses
'ambulante'

Pur Suedtirol

Tracking Days
March 24, 25, 28, 29, 30, 31
April 1, 2, 4, 5, 6, 7, 8, 11, 12, 13

Longest Distance Traveled
50 km

Deliveries
businesses
Pur Sudtirol stores

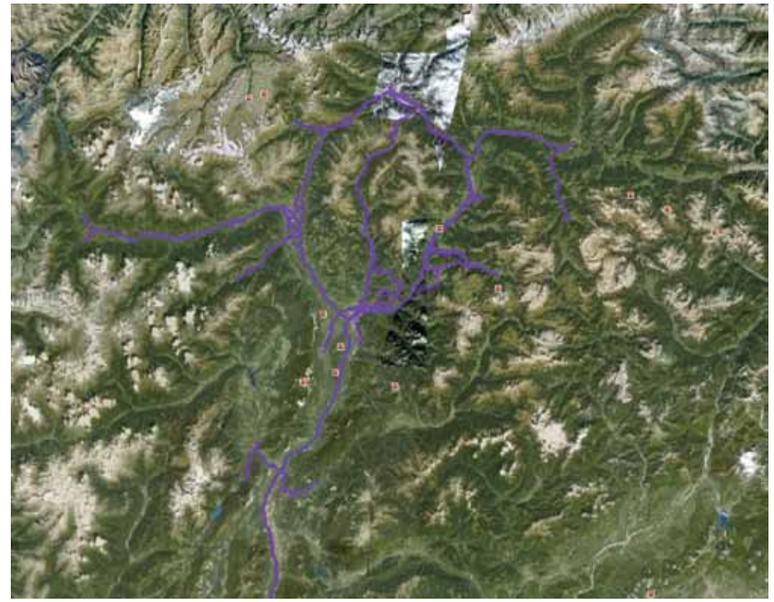
Steiner

Tracking Days
March 24, 25
April 20
May 24, 25, 26

Longest Distance Traveled
18 km

Deliveries
businesses
markets
'ambulante'

Meinbeck GPS traces for 5 weeks



Meinbeck GPS traces daily

Meinbeck Daily Routes
March 24, 25, 26, 28, 29, 30, 31
April 1, 2, 3, 6, 7, 8, 9, 11, 12, 13, 28, 29, 30
May 2, 5, 7, 8, 10, 11

interviewing farmers

Senseable Seeds :: Volunteer Questionnaire 2011
A project by Senseable City Lab in collaboration with TIS Innovation Park

	Krauterschlosse	Meinbeck	Pur Sudtirol	Biokistl	Steiner
Where is your company located?	Goldrain	Naili	Lana	Lana	Rasen-Antholz
How long have you been working in South Tyrol?	since 2005 (5 years)	since 1999 (12 years)	since 1977 (wine distribution), since 2010 (pur sudtirol brand), since 2010 (merano store)	since 2001 (10 years)	since 2005 (5 years)
What particular items do you sell?	herbs, spices, salts, teas, cosmetics, beauty products, etc	bread and pastries	wine, handicrafts and designer products	fruits, vegetables, dairy, etc / primarily focused on organic products	pig, cow, deer (speck, sausages, etc) / up to 30% from South Tyrol
What is your most popular (best selling) item?	honey and salts / no seasonal differences	rolls, baguette, etc / increased sales in summer (tourist season)	currently wine, but they are expanding with two new business units / fresh products sell best in the merano store	fruits and vegetables (account for 85% of sales)	speck and deer
How often are you selling to markets?	25 times a year, especially in the summer and autumn	up to three or four times a day during the week	they are trying to develop new business exposure so they participate in selective fairs and specialty events	there are 8 markets and fairs they sell to (not weekly markets)	4-5 times a week at approximately 5 different markets
Which markets do you participate in?	thematic (organic) and specialty markets / their products sell best to specialized customers who appreciate quality and are willing to pay a bit more	all markets between Merano, Bolzano, and Neumarket	mainly outside south tyrol	specialty markets (ex Bioliife)	South Tyrol, Trentino, Belluno
Do you participate in home deliveries?	no	no / selling 'ambulante style' by traveling to certain neighborhoods at certain times when the locals will know to look for them	no	yes	no / selling "ambulante style" instead
Do you see to restaurants or hotels?	hotels, yes / up to 60% is sold to hotels and shops / 20% is sold to markets and fairs / 20% is sold in their own shop and through the internet	yes / yes	yes, but only with wine / they do not yet have the logistics to distribute fresh produce / they are trying to integrate their packaged products with their wine	no / they sell to schools (kindergardens) and companies	yes
Do you participate in unschedule deliveries (ambulante)?	no	yes	no	no	yes
What vehicle do you use to travel?	trucks	vehicles / fold-open market trucks	trucks	trucks	trucks
How many vehicles do you have?	one	seven trucks / two fold-out trucks	four	six	two
Who are your primary customers?	tourists, locals, and cooks	locals and tourists / the ambulante customers are typically older and stay-at-home mothers	they sell to hotels/shops / the store sells to tourists and locals	private locals (80%) / companies and schools (20%)	see below
Do they travel to you?	yes	yes	yes (to the store)	yes (to the store	yes (to the store)
Do you travel to them?	yes	yes	not directly to individuals, but to businesses/companies	yes	yes
What is the most profitable way for you to sell your product?	selling in their own shop	the restaurants sell a lot but there is more competition for price / the ambulantes allow them to have more revenue per product / ambulante is 13-15 euro per ambulantes, markets / the customers will call if they need information (for example if someone has an allergy or diet restrictions)	n/a	n/a	their own shop / the ambulantes are the most profitable
How do you interact with customers?	most interaction is by email / customers ask about the products, benefits and opening hours		they just launched a newsletter to promote pur sudtirol among distributors / they do a customer survey event for educating customers about products	people order through the internet / they can request products through SMS system	some customers contact them by email and want to know where the products are available
How are sales divided between tourists and locals?	70% tourists / 30% locals.	80% local and 20% tourists / this data is only from what he sees at his own shop though	50 to tourists and 50 to locals	minimal	50% tourists / 50% locals
Are there any problems in your relationship with customers?	often transport fees for products are high (shipping costs) / availability of the product is sometime difficult to guarantee	they sometimes receives complaints about the quality of products or delivery problems	the requests between tourists and locals are often different which requires different interaction	delivery and quality problems result in about 15-20 reclamations a week	lack of communication is most common complaint from their customer survey / the customers want more information about the quality of the products
Any thoughts on how your relationship/communication with customers could improve?	they try to keep their opening hours flexible and try to deliver at home as much as possible	they want to focus more on the ambulantes	they want to provide more flexible opening hours	they want to provide more flexible opening hours	products are not perceived as high quality and they need to improve their packaging
How do you imagine sales in the future?	they're expanding by hiring saleswomen to assist with promotion and distribution in the field	n/a	education, expending businesses, children cooking, etc	application for smart phones would enhance customer communication / opening shops in the bigger centers of South Tyrol	they are thinking about selling more through the internet
Do you sell on the internet?	yes	yes, but this isn't a large part of the business / the restaurants have begun demanding more internet capabilities for purchasing	no, this is something they've considered but don't see as having long term benefits for sustainability	yes	no
Employee (company size).	family (4 employees)	family (50 employees)	n/a	not family (~35 employees)	n/a
Do you use a smart phone with internet?	only the son has a smart phone	yes (phone)	yes	yes	no
Additional Notes	they can't sell products from other farmers because they don't have the appropriate license / this limits their capacity to collaborate with others they struggle to understand how to deal with exclusivity (yes or no) to their customers	revenue breakdown / christmas market (4%), shop marling (14%), big mobile unit (13%), small mobile unit (7%), shop leifers (7%), retailer (15%), restuarants and hotels		2,500 clients	they have 2 shops (in south tyrol) and they deliver to restaurants and retailiers as well as delivering abroad to Switzerland, Austia, Germany, Italy

surveying markets

Sample from Customer Survey

Name of the market:
Location:

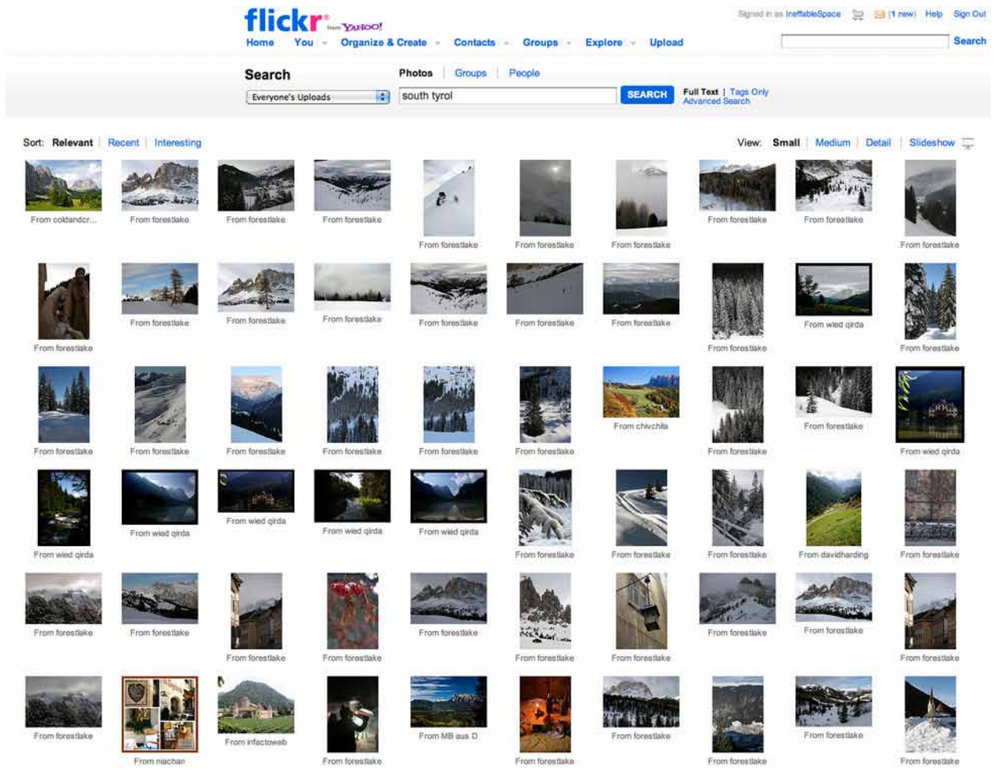
Nr.	Name of the Market	Location	Time of the Day	Survey duration	Gender	(60+ grandp	you buy from this market?	What area do you live in?	ZIP Code	State	What items are you shopping for?	important is for you the	do you typically	shopping at other	Which are those?	discover this shopping	where are you staying?
1	farmers' market	Kaltern	9:15 AM	2h 15min	w	30-40	once a week	Kaltern	39052	I	vegetables	very	5	n		local	
2	farmers' market	Kaltern	9:15 AM	2h 15min	w	60-70	first time	Lanchingen	89150	D	local products	very	10~20	maybe	Bozen, Meran	placard	hotel
3	farmers' market	Kaltern	9:15 AM	2h 15min	m	50-55	once a week	Kaltern	39052	I	salad	very	5	n		local	
4	farmers' market	Kaltern	9:15 AM	2h 15min	w	50-60	once a week	Kaltern	39052	I	mixed	very	15	y	Bozen	local	
5	farmers' market	Kaltern	9:15 AM	2h 15min	w	55-60	once a month	Kaltern	39052	I	bacon, vine, cheese	important	5	y	Bozen	newspaper	
6	farmers' market	Kaltern	9:15 AM	2h 15min	w	65-75	first time	Weingarten	88250	D	bread, vine, syrup	very	5	y	Bozen	hotel	hotel
7	farmers' market	Kaltern	9:15 AM	2h 15min	w	50-60	once a month	Kaltern	39052	I	vegetables, cheese	very	10	n		local	
8	farmers' market	Kaltern	9:15 AM	2h 15min	m	45-55	first time	München	80331	D	bacon, vine, cheese	very	30	y	Meran	coincidence	hotel
9	farmers' market	Kaltern	9:15 AM	2h 15min	m	45-50	first time	Bruneck	39031	I	bacon, honey	very	30	y	Bruneck	coincidence	
10	farmers' market	Kaltern	9:15 AM	2h 15min	m	60-65	first time	St. Johann in Tirol	6380	A	bacon, honey	essential	60	n		coincidence	hotel
11	farmers' market	Kaltern	9:15 AM	2h 15min	w	50-60	once-twice a month	Kaltern	39052	I	vegetables, cheese, herbsage	important	10	y	Bozen, Ritten	community paper, colleagues	
12	farmers' market	Kaltern	9:15 AM	2h 15min	w	45-55	once-twice a month	Kaltern	39052	I	vegetables, bread	important, organic	10~15	n		local	
13	farmers' market	Kaltern	9:15 AM	2h 15min	m	30-35	first time	Pfaffenhofen an der Ilm	85276	D	typical products (bacon, cheese)	very	60	n		tourist information	guesthouse
14	farmers' market	Kaltern	9:15 AM	2h 15min	w	65-70	first time	Unsinau	73207	D	chorse, Pesto	very	30	maybe		hotel	hotel
15	farmers' market	Kaltern	9:15 AM	2h 15min	w	40-50	once a week	Eppan an der Weinstrasse	39057	I	vegetables	very	30	y	Eppan	coincidence	

Sample from Vendor Survey

Name of Market
Location

Nr.	Name of the Market	Location	Time of the Day	Survey duration	What is your company/farm name?	Where is your company/farm located?	ZIP code	How often do you sell at this market?	How long (hrs) do you sell at this market?	What are your best selling items?	Which of your items are from Southtirol?	Do you sell on more markets?
1	farmers' market	Kaltern	9:15 AM	2h 15min	Wiesenhof	Unsere Liebe Frau im Walde- St. Felix	39010	once a week	7.30-13	bacon, sausage, meat	own production	Schlanders
2	farmers' market	Kaltern	9:15 AM	2h 15min	Mooshäusl	Terlan	39018	once a week	7.30-13	seasonal vegetables	own production	Terlan, Schlanders, farmshop
3	farmers' market	Kaltern	9:15 AM	2h 15min	Wegerhof	Passeier	39015	once a week	7.30-13	cheese, milk products	own production	Meran, from the farm
4	farmers' market	Kaltern	9:15 AM	2h 15min	Folie	Prad am Stilfser Joch	39026	once a week	7.30-13	bread	own production	Schlanders, Vinschger farmers market
5	farmers' market	Kaltern	9:15 AM	2h 15min	Innerplatzerhof	Meinegg	39057	once a week	7.30-13	bacon, eggs	own production	Schlanders, Vintel
6	farmers' market	Kaltern	9:15 AM	2h 15min	Luggin Steffelehof	Kaltern	39052	once a week	7.30-13	wine, juice, fruit	own production	Bruneck
7	farmers' market	Kaltern	9:15 AM	2h 15min	Landhaus Ruedl	Kaltern	39057	once a week	7.30-13	herbals, vegetables	own production	Meran
8	monthly market	Sarentha l	12:00 AM	1h 30min	Gärtner Bayer	Leifers	39055	3-4 times a year	6.00-13	herbals, balconyflowers	own production	Bozen, Auer
9	monthly market	Sarentha l	12:00 AM	1h 30min	Tononi	Bozen	39100	once a month	6.00-14	flowers and plants of the season	90% own production	everywhere in southtirol
10	monthly market	Sarentha l	12:00 AM	1h 30min	Seppi Claudio	Val Di Non	38010	6-7 times a year	6.00-14	Cheese	own production from Trentino	Kaltern, Eppan monthly
11	monthly market	Sarentha l	12:00 AM	1h 30min	Patrizzio	Meran	39012	once a month	6.00-14	felthats	imported felt, manufacured in southtirol	Bozen, Meran
12	monthly market	Sarentha l	12:00 AM	1h 30min	Spinradl	St. Leonhard in Passeier	39015	once a month	7.00-13	woolproducts, Sarner, shirts	70% Southtirolean (woolproducts) 30% Italian	Meran, Brixen
13	monthly market	Sarentha l	12:00 AM	1h 30min	Prader	Kitten	39054	8 times a year	6.00-13	seasonal vegetables and plants	own production	Sarnthal, Bozen
14	monthly market	Sarentha l	12:00 AM	1h 30min	Zelger Georg	Bozen	39100	first time	6.00-14	balconyflowers	80% own production 20% Southtirolean	
15	monthly market	Sarentha l	12:00 AM	1h 30min	Oberrauch	Trient	38010	twice a year	6.00-14	a bit of everything	seeds from southtirol and own production (Trentino)	innichen, St. Christina, Brixen,

data mining flickr



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12	343859318	0			##########	##########		15	weissensee;	tyrol	46.717	13.2861	3652196844	1
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14	343858746	0			##########	##########		15	weissensee;	tyrol	46.7185	13.2859	3652196844	1
15	346818329	0			##########	1/1/07 0:28		16	italy;capodar	tyrol	46.3399	10.868	47247806@f	4
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17	346827049	0			##########	##########		16	italy;tommas	tyrol	46.3401	10.8686	47247806@f	9
18	346819264	0			##########	1/1/07 0:28		16	italy;capodar	tyrol	46.3399	10.868	47247806@f	4
19	346823029	0			##########	##########		16	italy;capodar	tyrol	46.341	10.8697	47247806@f	4
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25	358574805	0			##########	1/1/07 0:00		11	davos;velvia:	tyrol	46.7838	9.84787	68233298@f	3
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30	389816781	0			##########	##########		15	mountain;ice	tyrol	46.7979	9.82582	60525476@f	6
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32	389825351	0			##########	1/1/07 0:05		15	switzerland;s	tyrol	46.8007	9.82189	60525476@f	4
33	389827008	0			##########	1/1/07 0:06		15	mountain;sw	tyrol	46.8007	9.82189	60525476@f	4
34	389824520	0			##########	1/1/07 0:04		15	road;street;r	tyrol	46.8007	9.82189	60525476@f	6
35	389834292	0			##########	1/1/07 0:07		15	road;street;r	tyrol	46.8007	9.82189	60525476@f	6
36	389836112	0			##########	1/1/07 0:11		15	mountain;sw	tyrol	46.8007	9.82189	60525476@f	4
37	389838031	0			##########	1/1/07 0:12		15	mountain;sw	tyrol	46.8007	9.82189	60525476@f	5
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39	389843853	0			##########	1/1/07 0:14		15	switzerland;t	tyrol	46.8007	9.82189	60525476@f	6
40	389843322	0			##########	1/1/07 0:13		15	mountain;ski	tyrol	46.8007	9.82189	60525476@f	6
41	389850227	0			##########	1/1/07 0:25		15	sign;switzerl	tyrol	46.8007	9.82189	60525476@f	3
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47	389859683	0			##########	1/1/07 0:42		15	sunset;moun	tyrol	46.8007	9.82189	60525476@f	6
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49	389861995	0			##########	1/1/07 0:43		15	sunset;moon	tyrol	46.8007	9.82189	60525476@f	9
50	389860160	0			##########	1/1/07 0:42		15	sunset;moon	tyrol	46.8007	9.82189	60525476@f	7
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62	390139595	0			##########	1/1/07 0:56		15	church;lensb	tyrol	46.8007	9.82189	60525476@f	5
63	390136411	0			##########	1/1/07 0:53		15	sunset;moun	tyrol	46.8007	9.82189	60525476@f	8
64	390145903	0			##########	1/1/07 0:57		15	mountain;ch	tyrol	46.8007	9.82189	60525476@f	6
65	390141973	0			##########	1/1/07 0:57		15	lensbaby;swi	tyrol	46.8007	9.82189	60525476@f	6
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75	390147939	0			##########	1/1/07 0:59		15	sunset;moun	tyrol	46.8007	9.82189	60525476@f	5
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81	390155908	0			##########	1/1/07 1:01		15	mountain;sw	tyrol	46.8007	9.82189	60525476@f	3
82	390154951	0			##########	1/1/07 1:00		15	sunset;moun	tyrol	46.8007	9.82189	60525476@f	5
83	390306625	0			##########	1/1/07 1:02		15	church;switz	tyrol	46.8007	9.82189	60525476@f	3
84	390311980	0			##########	1/1/07 1:04		15	sunset;switz	tyrol	46.8007	9.82189	60525476@f	4
85	390308292	0			##########	1/1/07 1:03		15	mountain;sw	tyrol	46.8007	9.82189	60525476@f	4
86	390305375	0			##########	1/1/07 1:02		15	tractor;switz	tyrol	46.8007	9.82189	60525476@f	5

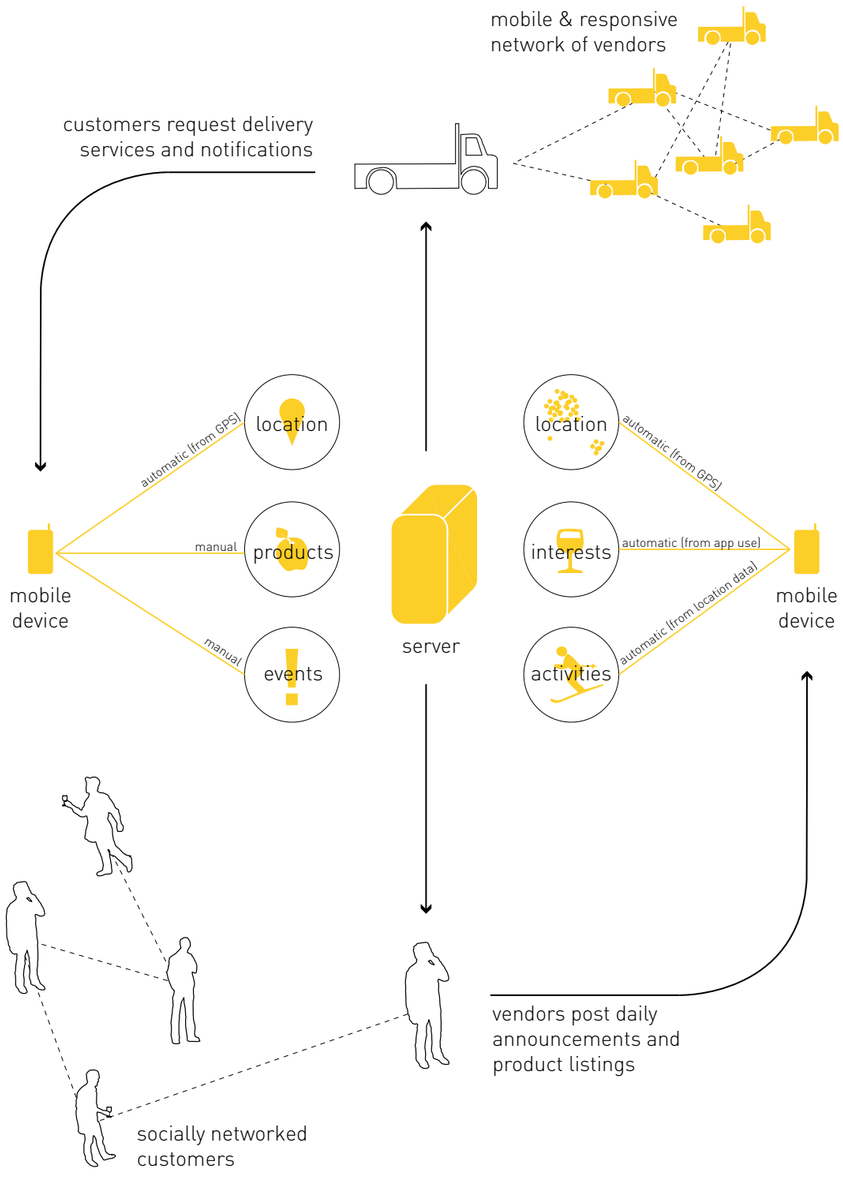
4 System Proposal
Real-Time Communication Platform

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	For Customers
Functionalities	• 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.	• 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	Back End
Hardware	• Smart Device (phone or tablet) with integrated GPS • Smart Device Holder • Smart Device Charger • SIM Card	• 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)
		• Database Contents
		  • Vendor Locations
		  • Current Locations
		  • Historic Locations
		  • Vendor Database
		  • Name of Farm
		  • Types of Products
		  • Additional Details
		  • Customer Database
		  • Name (fill in)
		  • Address (fill in)
		  • Notifications
		  • Purchase History (auto list)
		• Messaging Platform
		  • Outgoing (from vendors)
		  • Products Available
		  • Promotions
		  • General Comments
		  • Delivery Confirmations
		  • Incoming (from customers)
		  • Requests for Deliveries
		  • General Comments
		• Food Network
		  • Database Contents
		  • RT Supply Locations
		  • RT Demand Locations
		  • Complimentary Foods
		  • Competitive Foods
		  • Food Search Features
		  • By Category
		  • By Location
		  • By Complimentary Items
		  • By Competitive Items

5 Design Proposal
Producers, Products, People & Places

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**

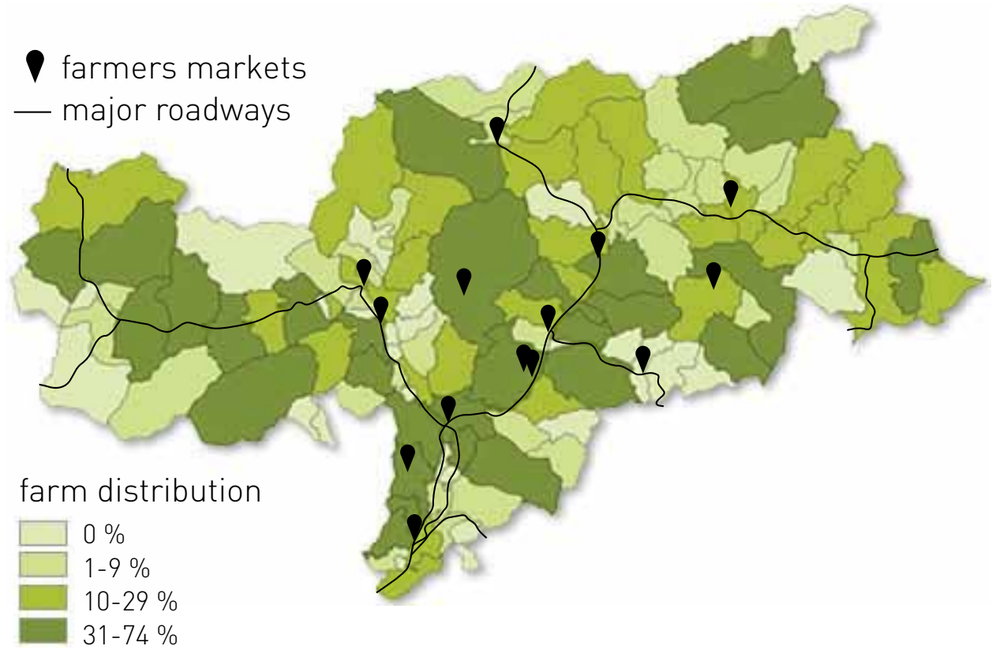
connect **people**

network **products**

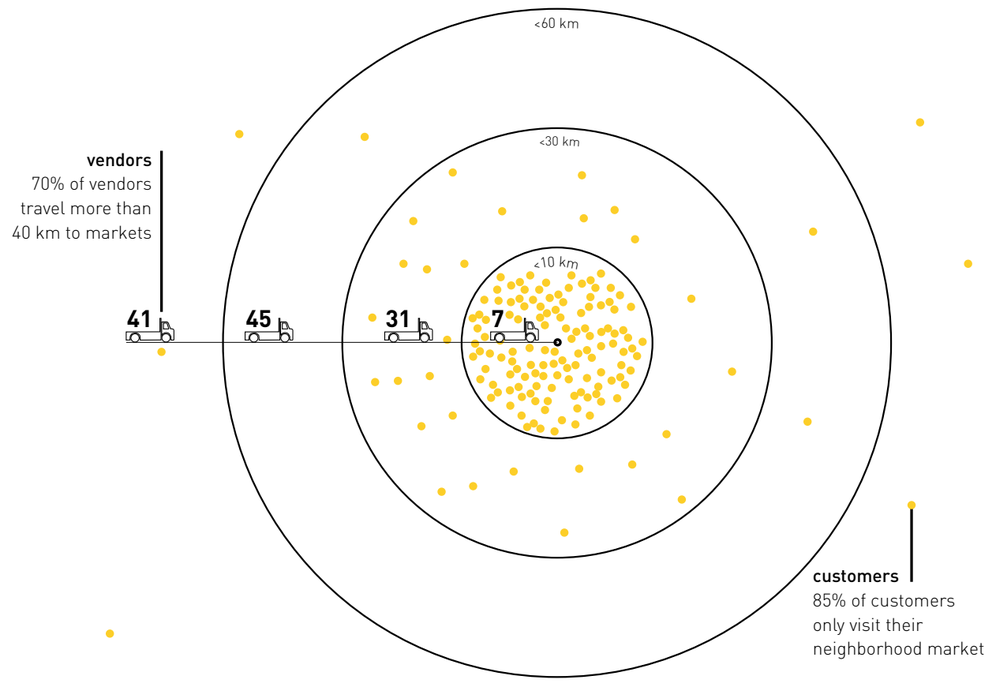
activate **places**

mobilize producers

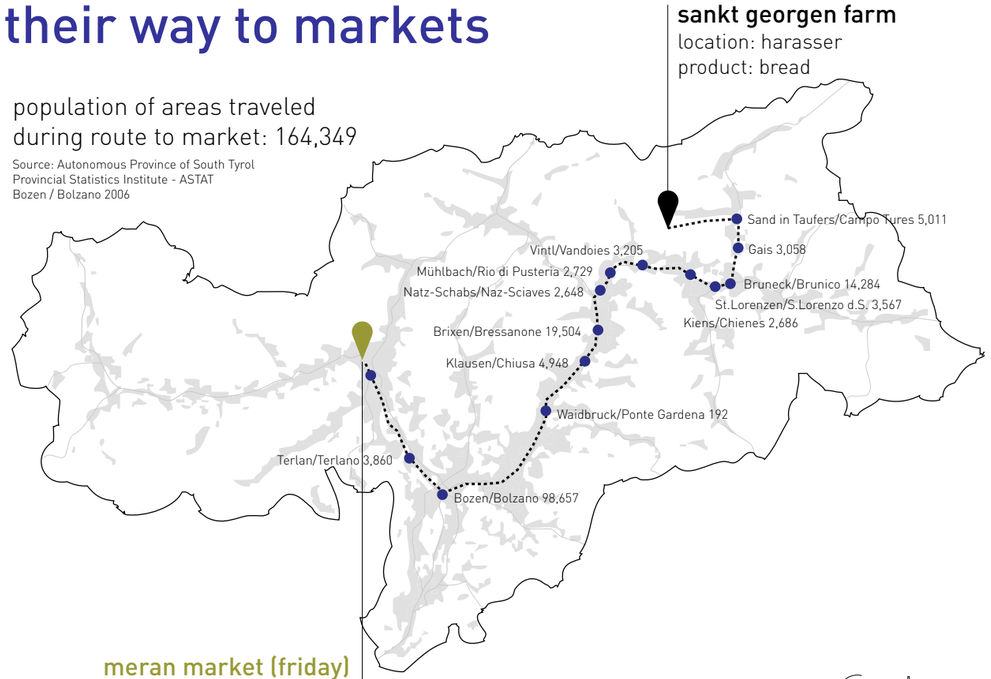
mobility is critical for regional producers



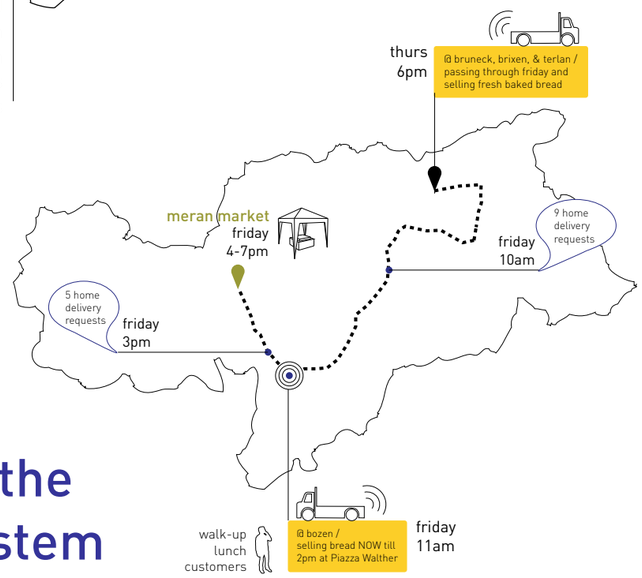
locals rarely shop at markets beyond their neighborhood

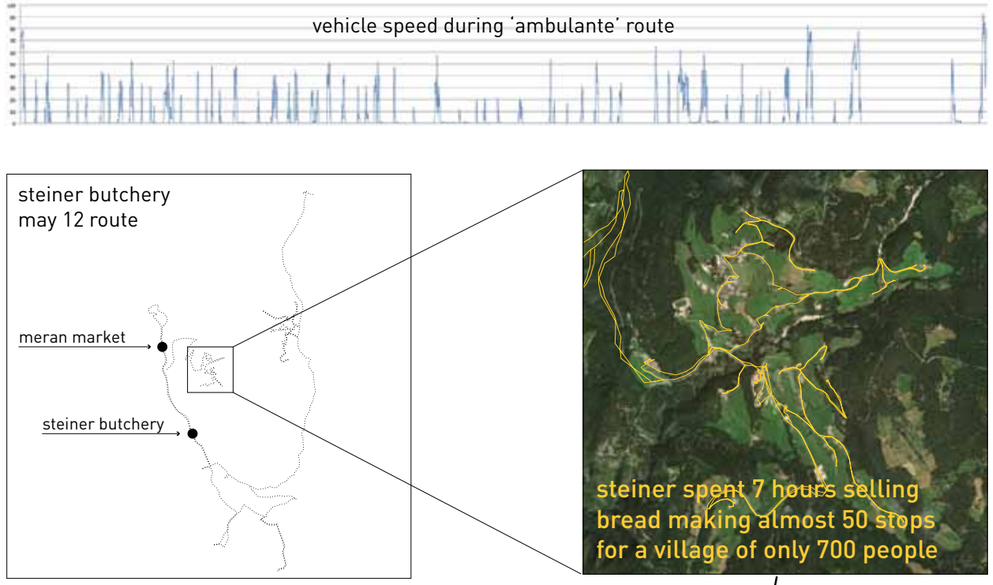


vendors travel past many underserved villages on their way to markets



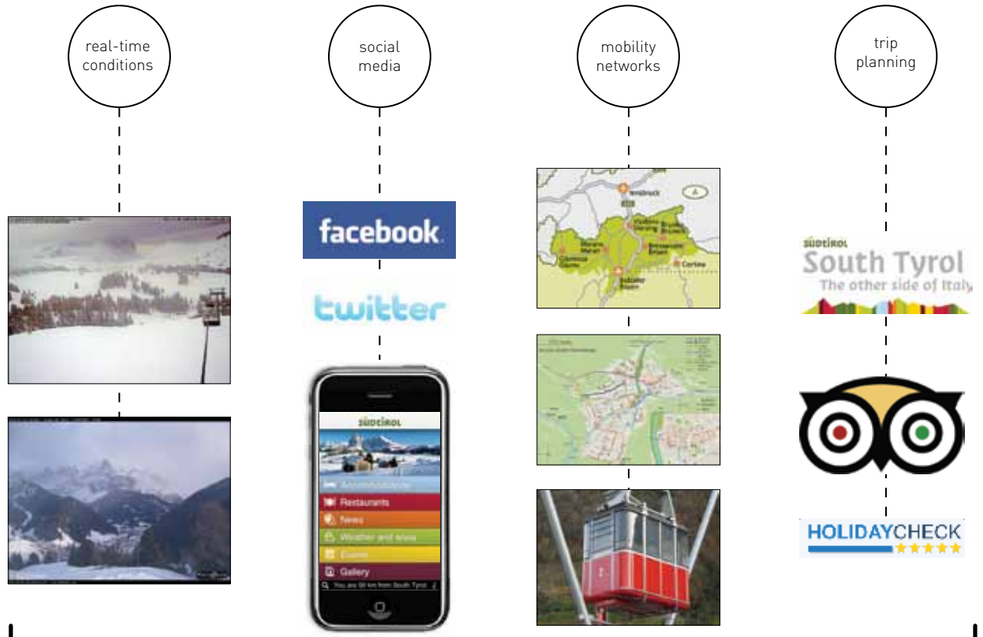
new route for vendors using the FlexMarket system



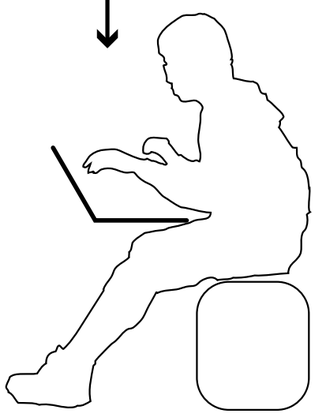


ambulante routes are inefficient and service is often inconsistent

connect people

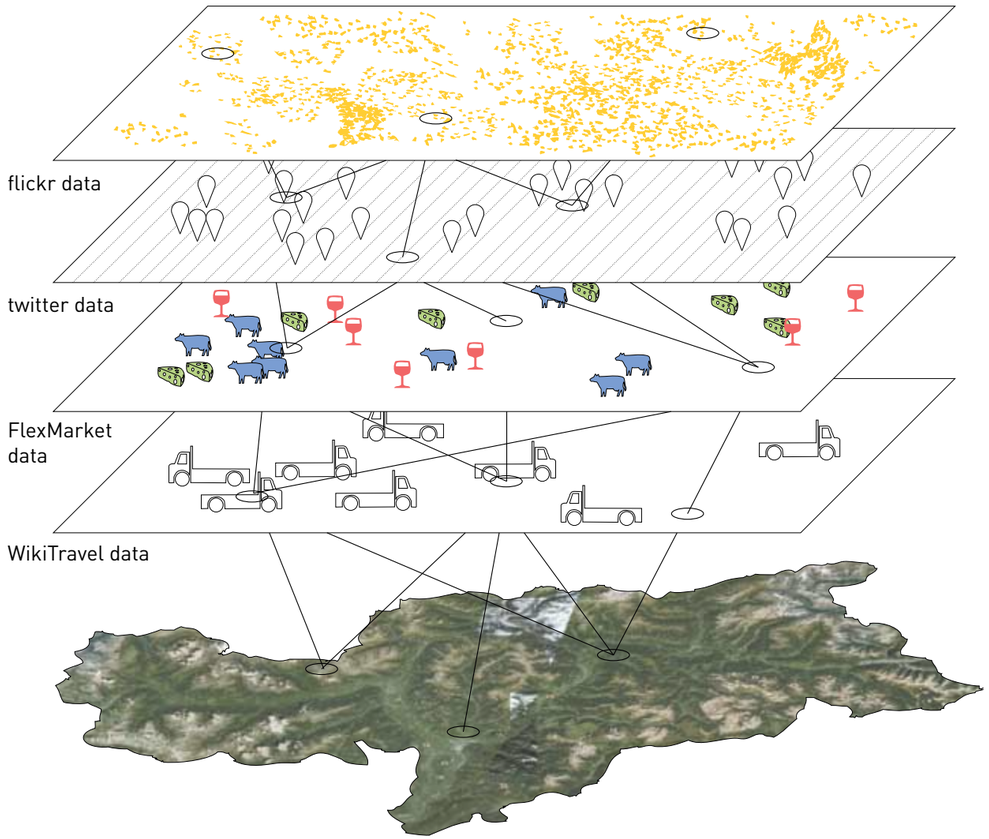


people are using technology to connect in new ways



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

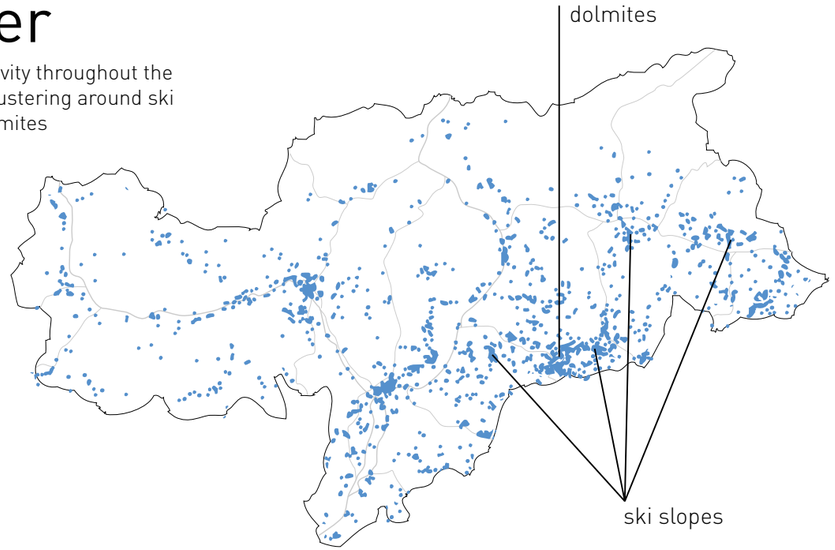
data sets from different sources can be combined to generate personalized maps and suggestions for how to experience south tyrol



south tyrol is active throughout the year with each season bringing new activities

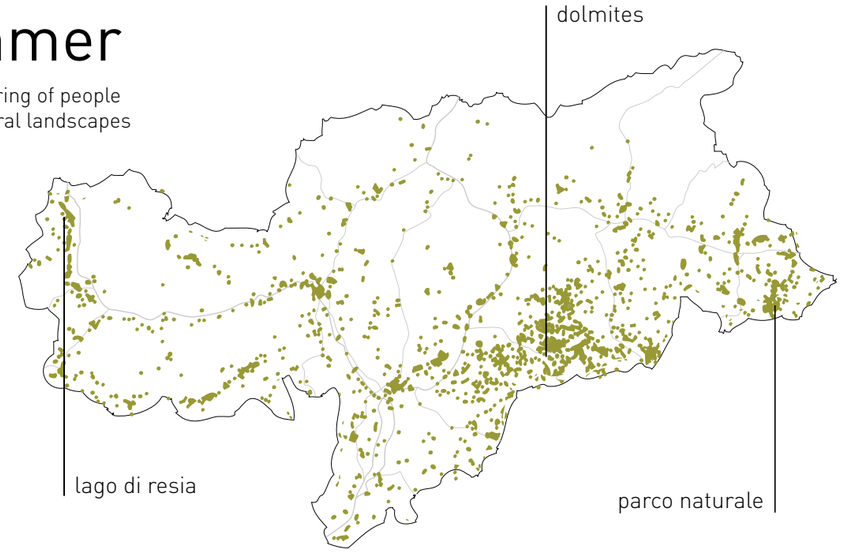
winter

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



summer

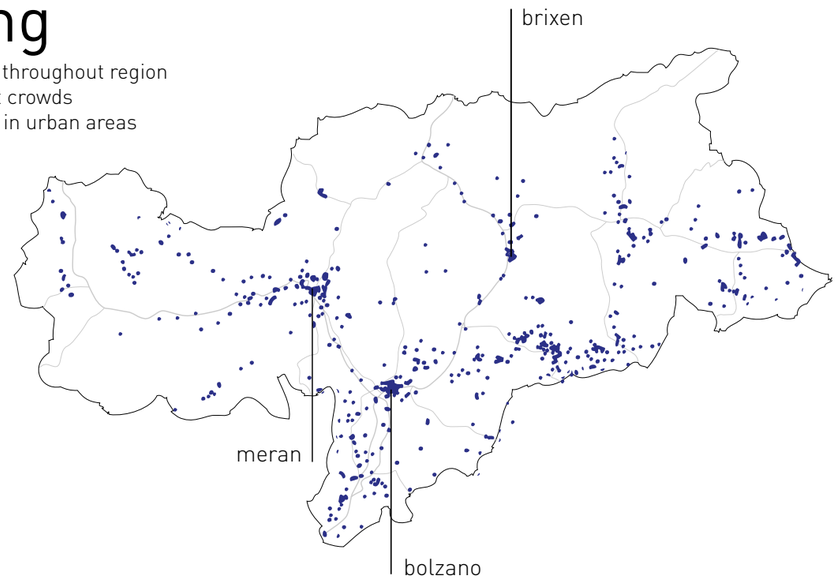
loose clustering of people around natural landscapes



204,551 flickr photos
Flickr Data Mining by Fabien Girardin
Visualization by Bernd Resch and Jennifer Dunnam

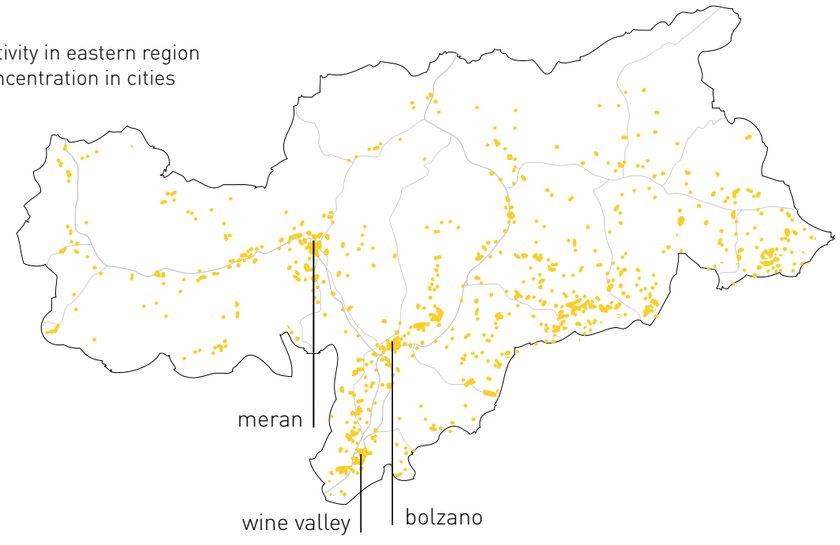
spring

lesser activity throughout region but significant crowds concentrating in urban areas



fall

scattered activity in eastern region with high concentration in cities



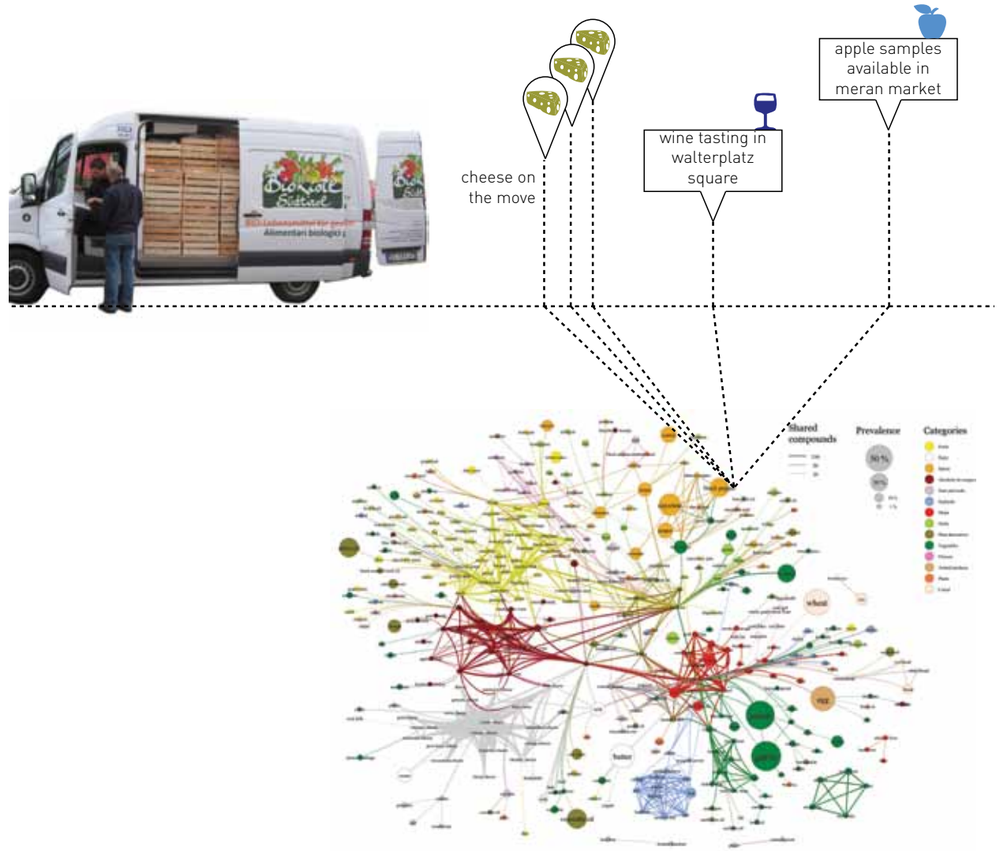
network products

local products are often difficult to find within busy markets

Qualità
ALTO ADIGE

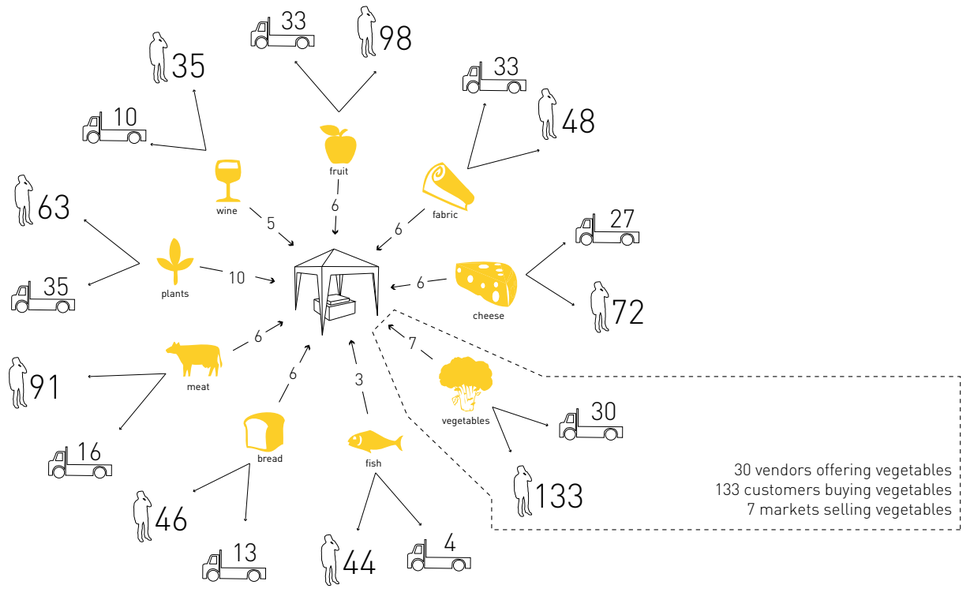
South Tyrol has initiated a program for labeling locally produced items but are looking for more active ways to promote these products

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

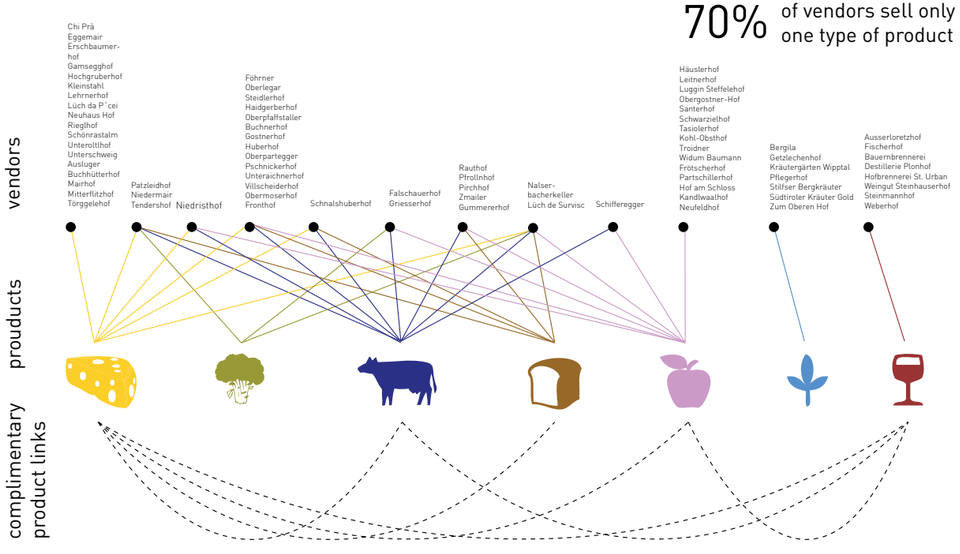


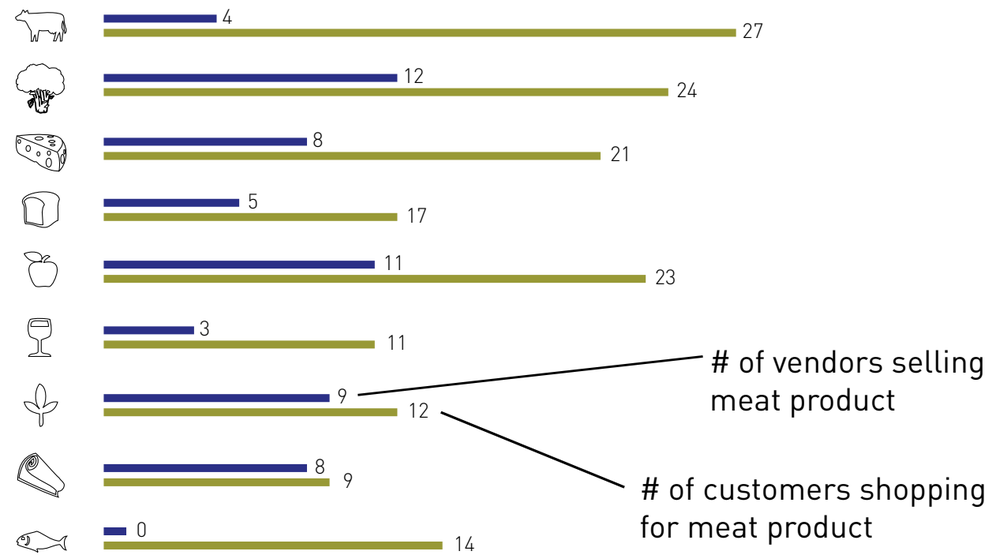
Excerpt from "Flavor network and the principles of food pairing" by Yong-Yeol Ahn, Sebastian E. Ahnert, James P. Bagrow, Albert-Laszlo Barabasi

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.

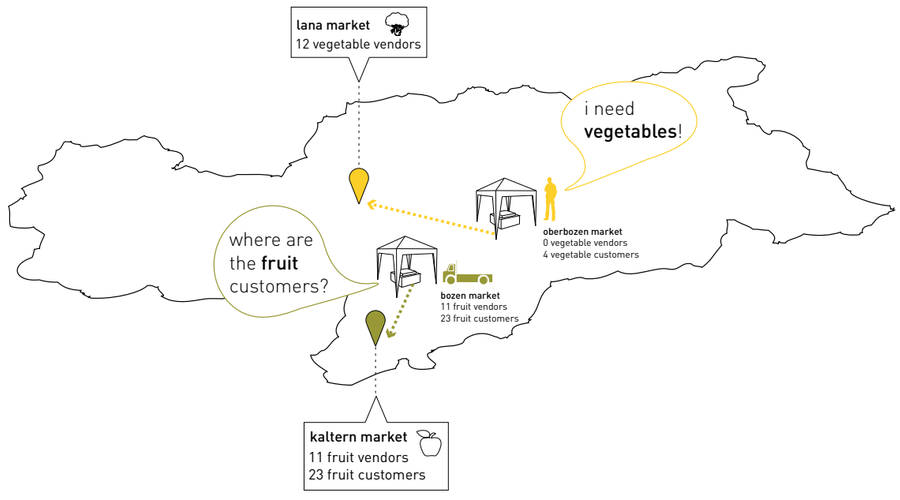


the network of food forms connections among complementary products

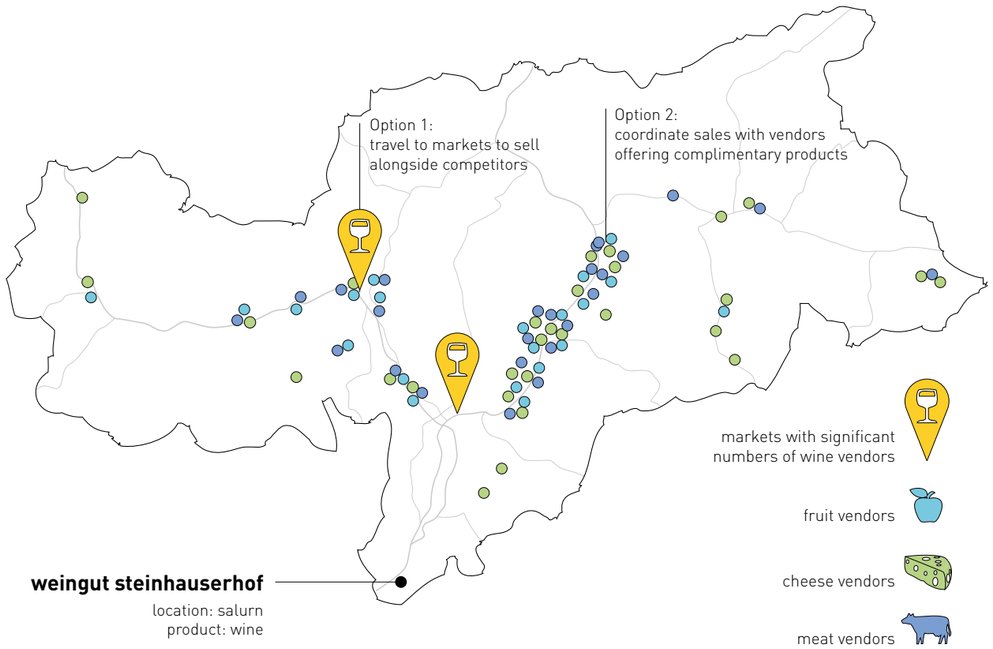


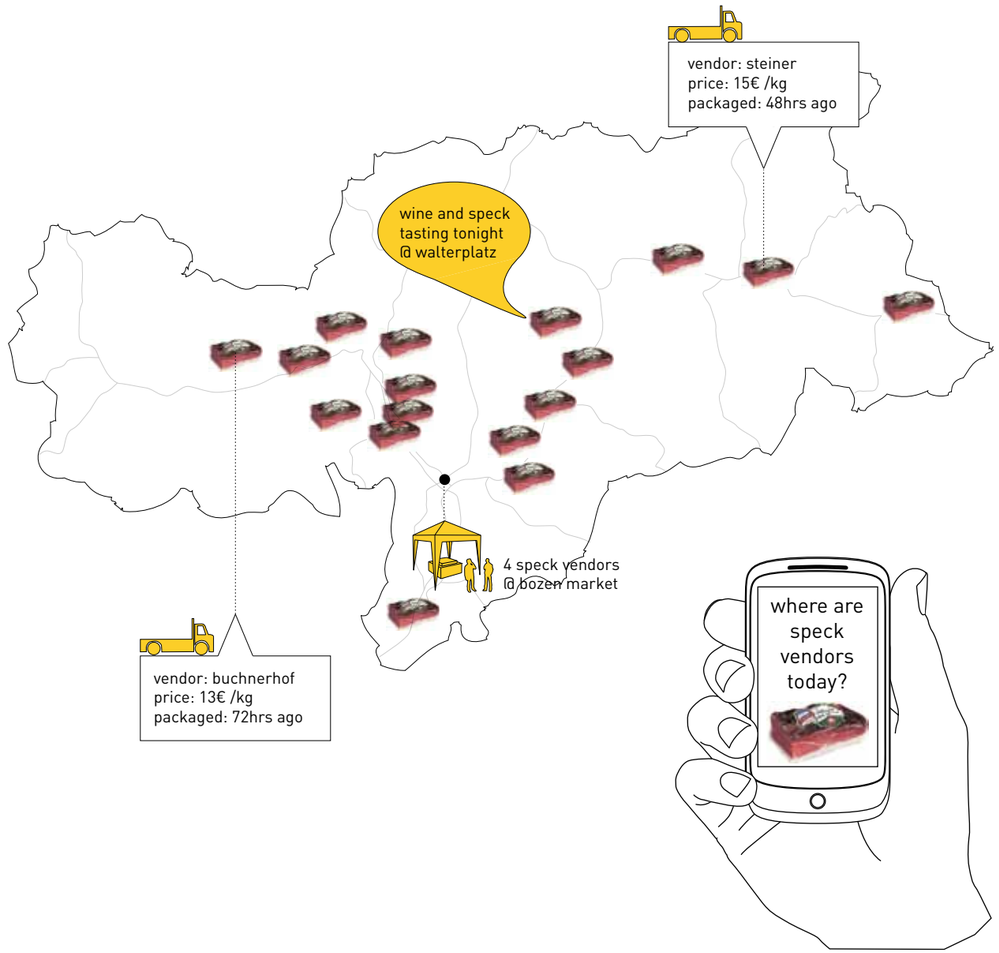


supply and demand fluctuations can be tracked in real-time and used to make decisions on where to shop and sell



FlexMarket helps customers navigate a landscape of food





activate places

illegal street sales

counterfit merchandise / new york city

roaming carts in public spaces

lemonade cart / boston

food truck parking

solar food truck / austin

ephemeral

weekly market stand clusters

farmers market / los angelos

established market district

les halles / paris

permanent market structure

santa caterina / barcelona

integrated market support infrastructure

visserijplein plaza / rotterdam

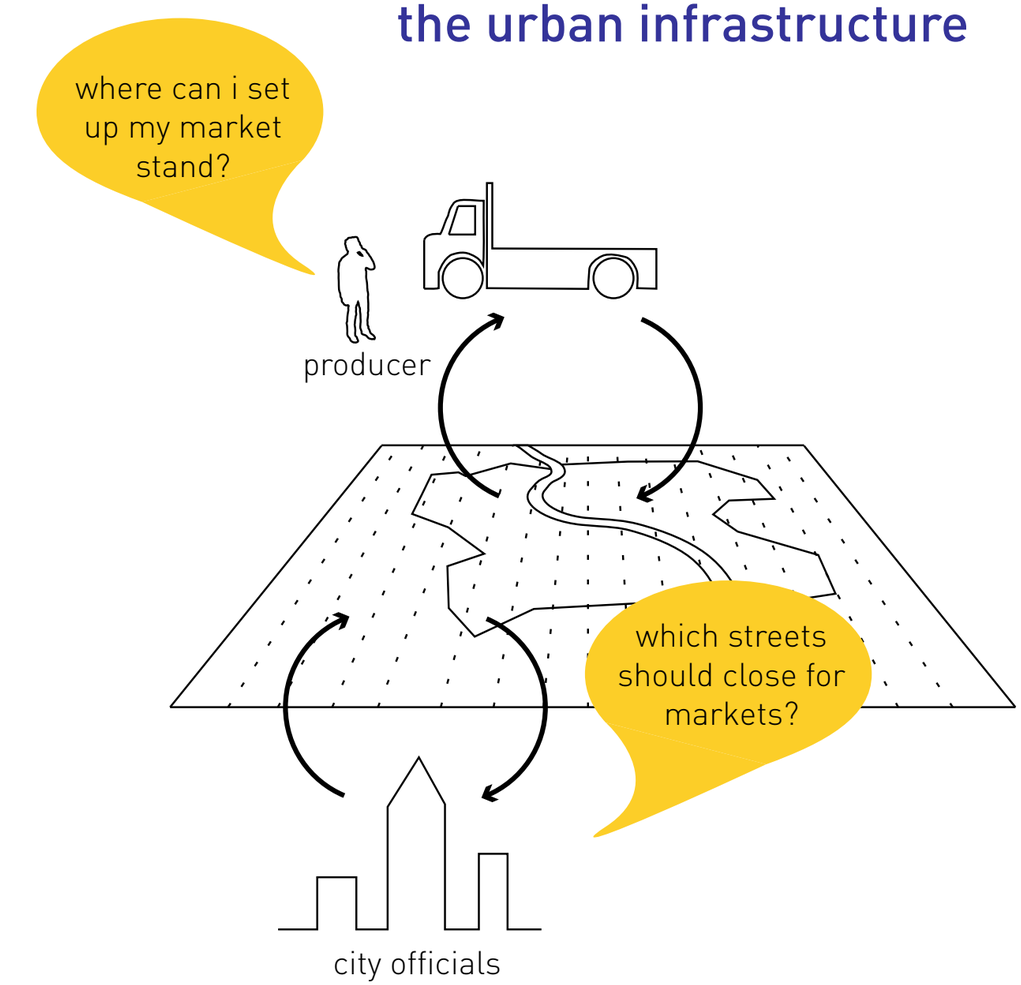
permanent

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

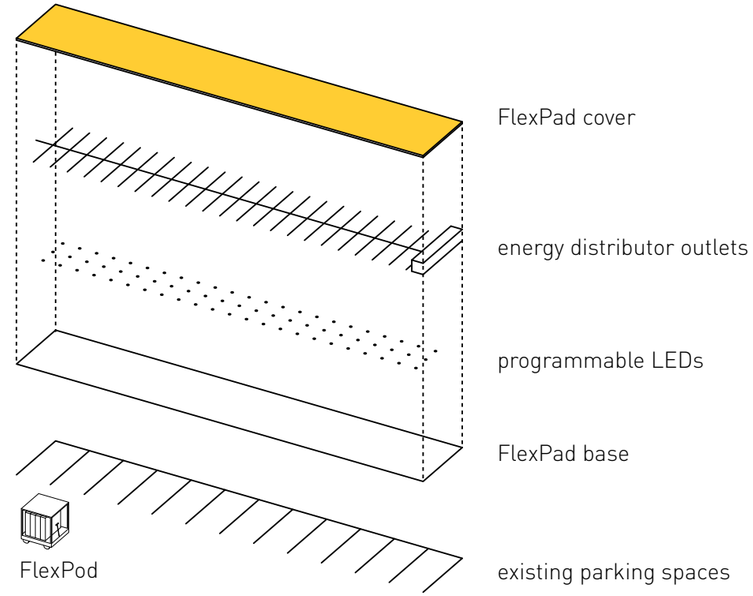
FlexMarket enables real time communication with the urban infrastructure



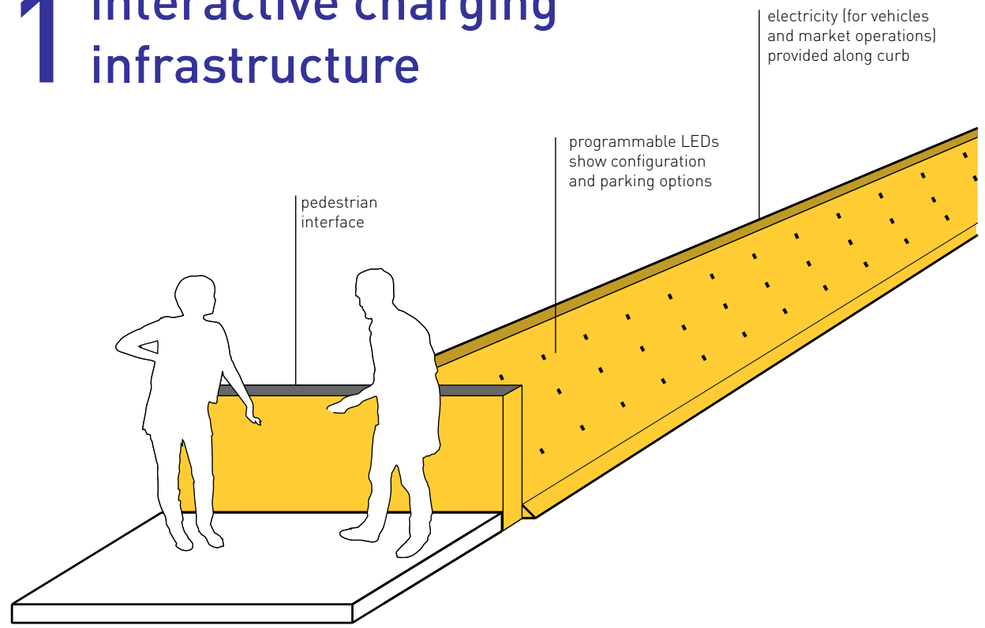
the physical manifestation of FlexMarket involves three essential parts

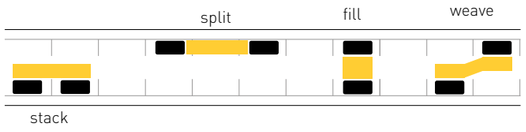
1. interactive charging infrastructure
2. self-organizing clusters
3. customizable vending units

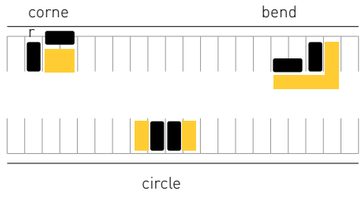
In order to “activate places”, the FlexMarket proposal includes a business strategy for launching a shared vehicle program controlled by a smart charging infrastructure. The vehicles, called FlexPods, are small vending units that can be customized by producers and easily unfolded to display products 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 vehilces alongside one another and form market stands that are welcoming to browsing customers.



1 interactive charging infrastructure



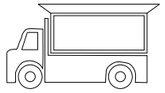




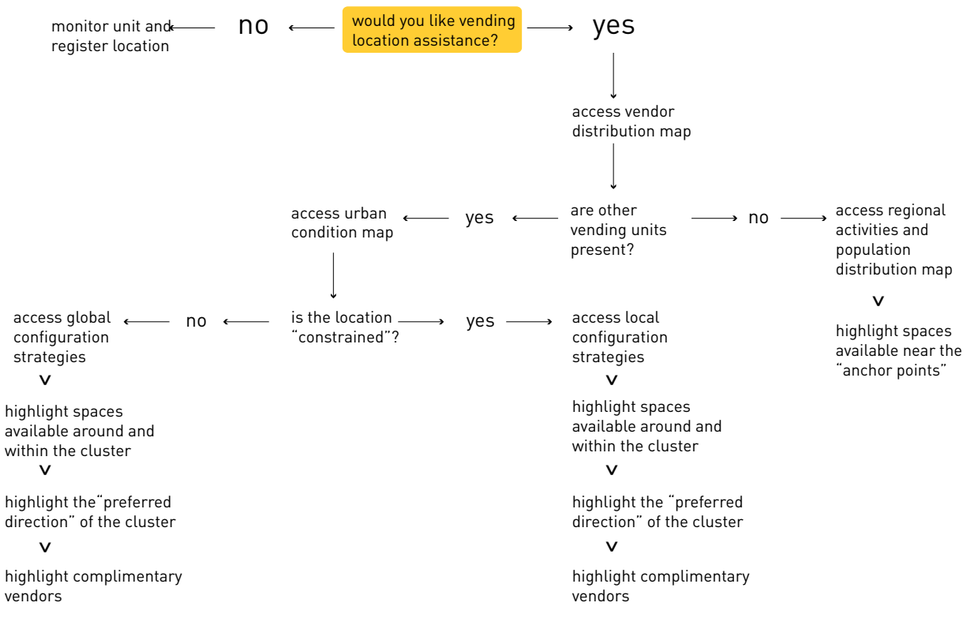
place-making configuration library

2 self-organizing clusters

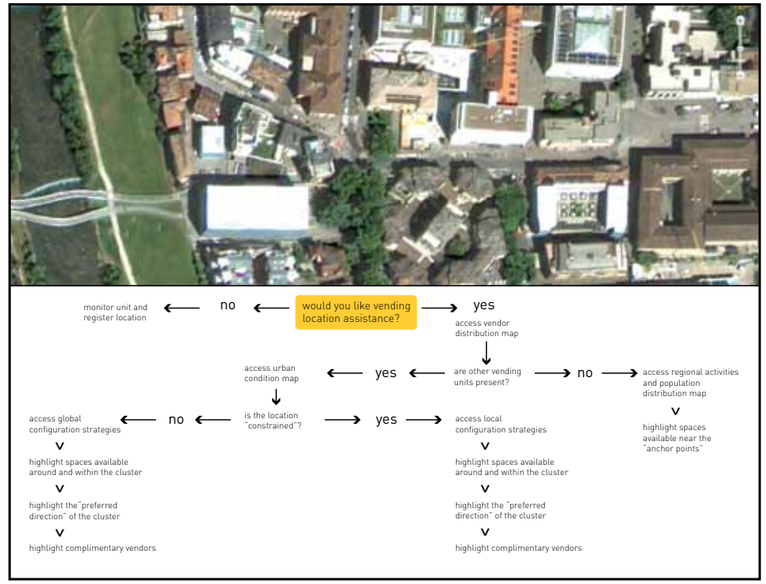
decision tree



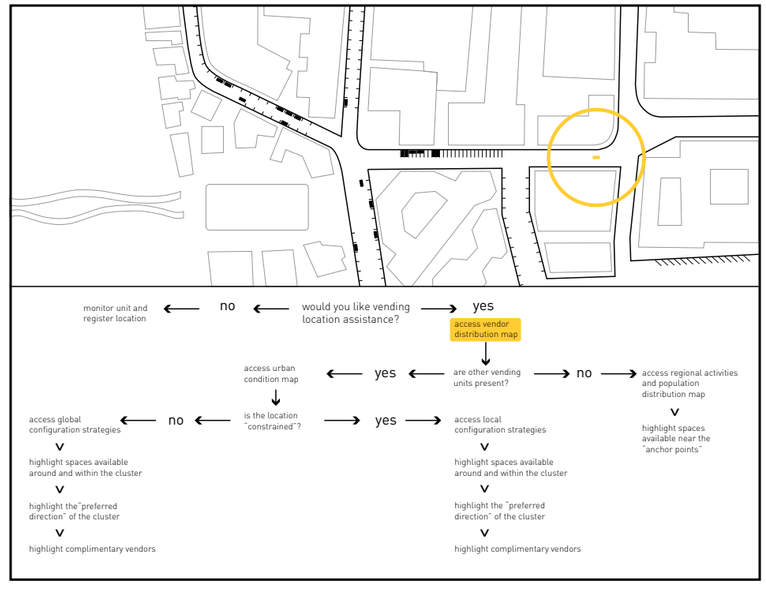
the vendor approaches an area and the system asks for one response...



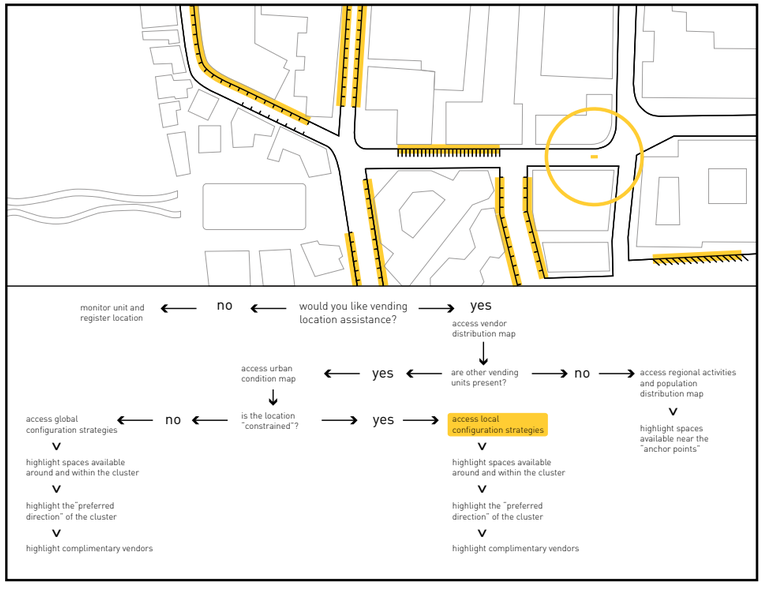
decision tree scenario - step 01



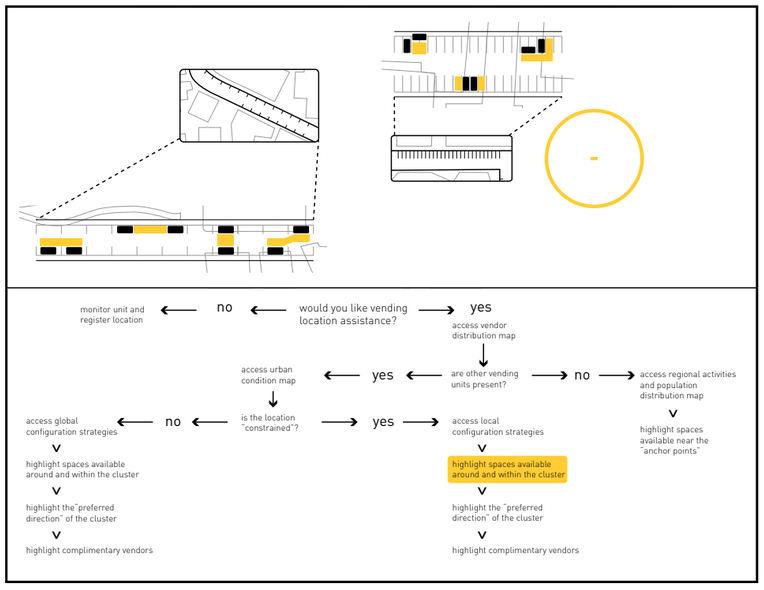
decision tree scenario - step 02



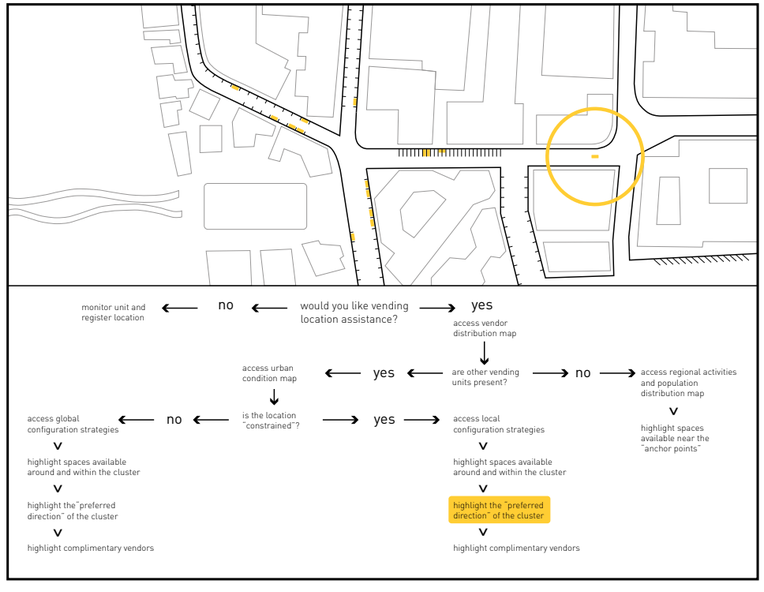
decision tree
scenario - step 03



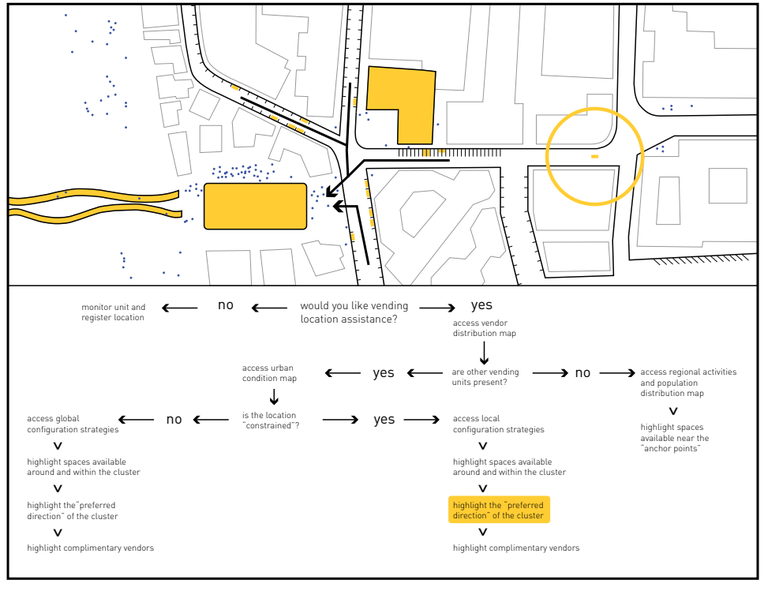
decision tree
scenario - step 04



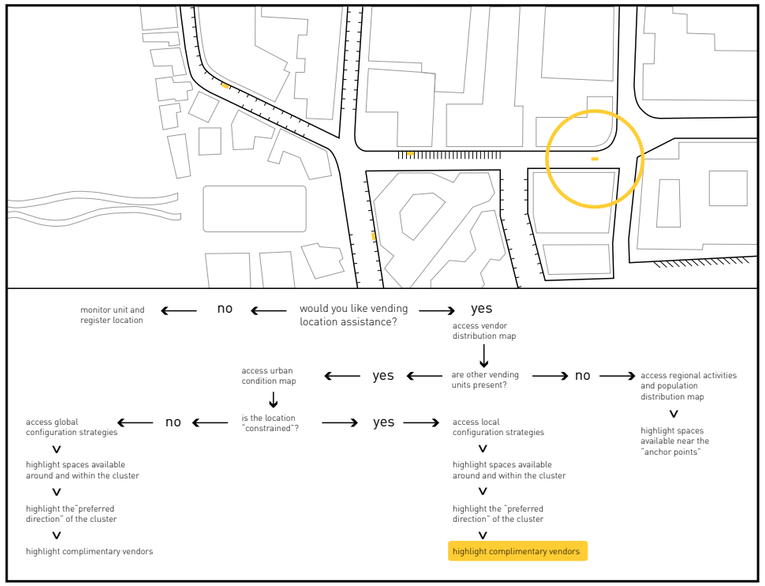
decision tree
scenario - step 05



decision tree
scenario - step 06

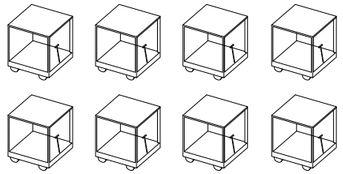


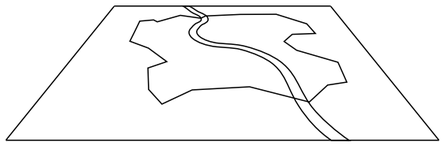
decision tree
scenario - step 07



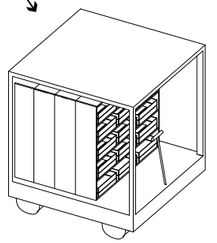
cluster "anchors" are identified throughout the city as points of interest where the growing market might be steered towards

the farmers union owns and maintains the FlexPods





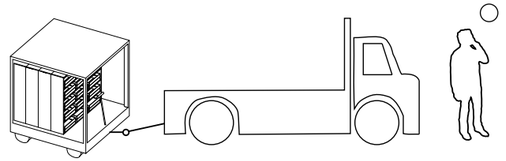
the city invests in a charging infrastructure for electric vehicles and FlexPods are the inital fleet of vehicles to be supported

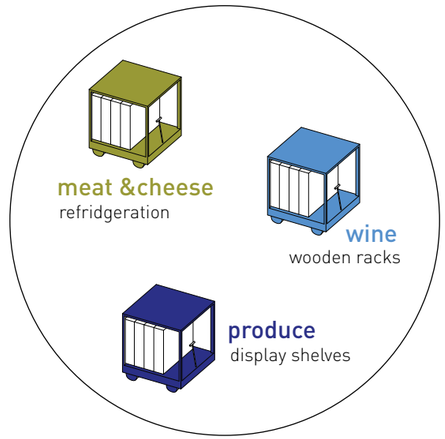


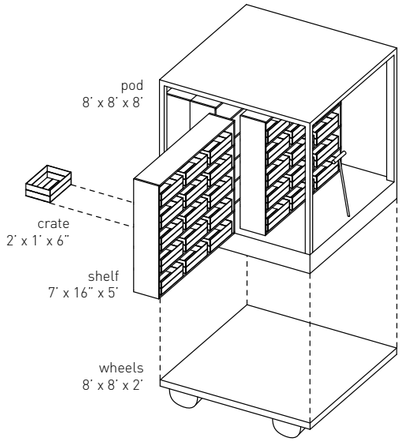
vendors rent the FlexPods for weekly or seasonal time periods

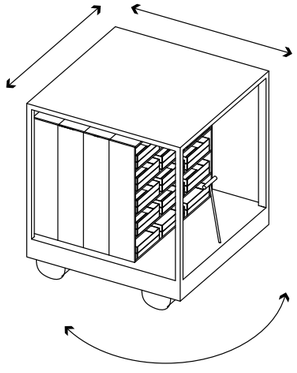
3 customizable vending units

producers customize the FlexPods according to their needs

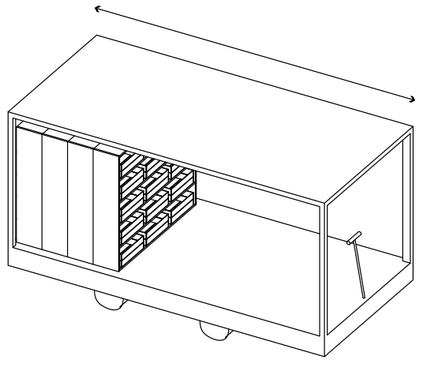




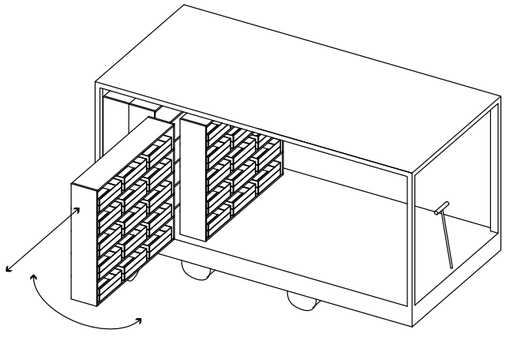




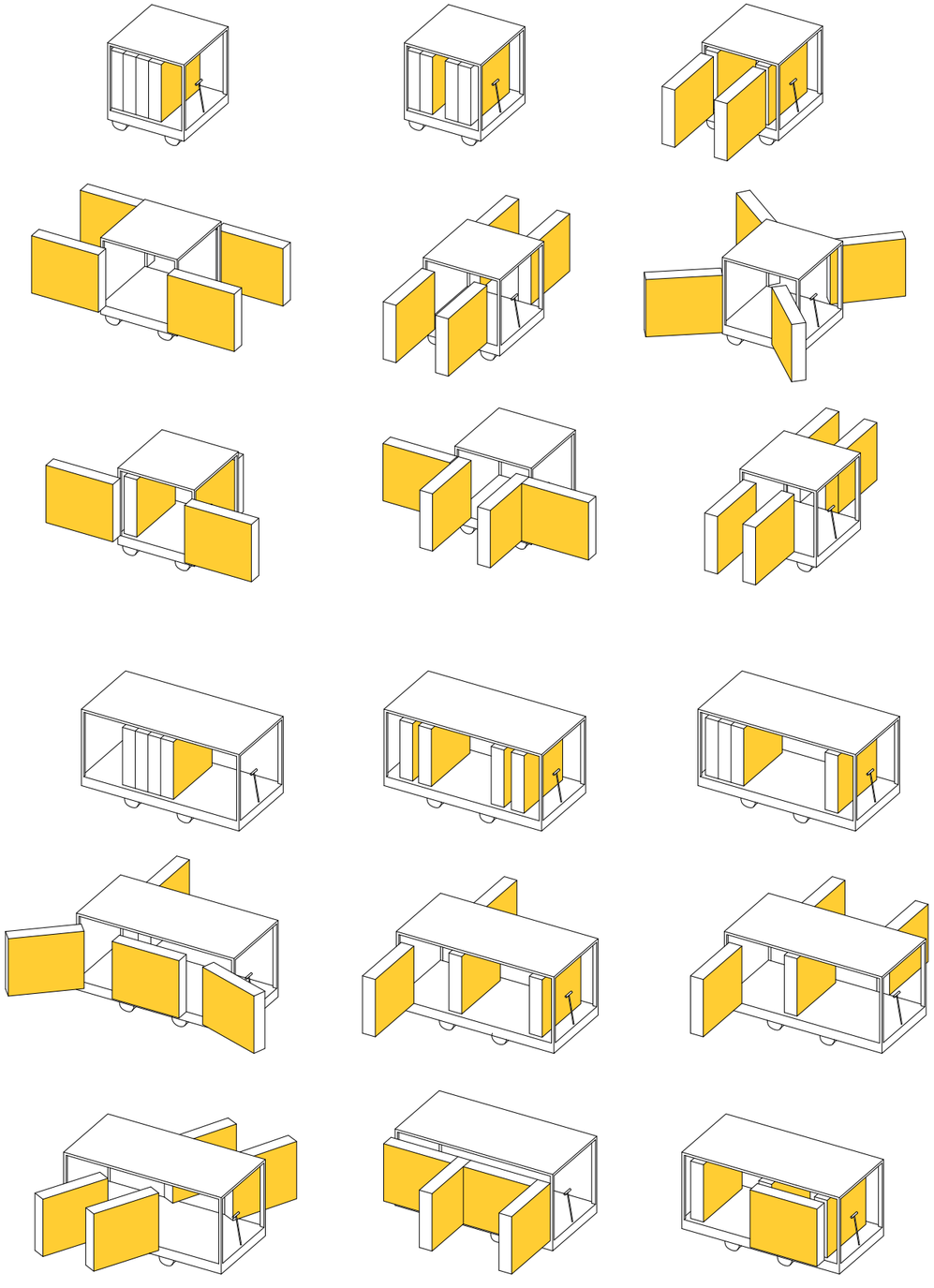
FlexPod can be independently driven or pulled by another vehicle for long distances



FlexPod can expand for additional storage and space



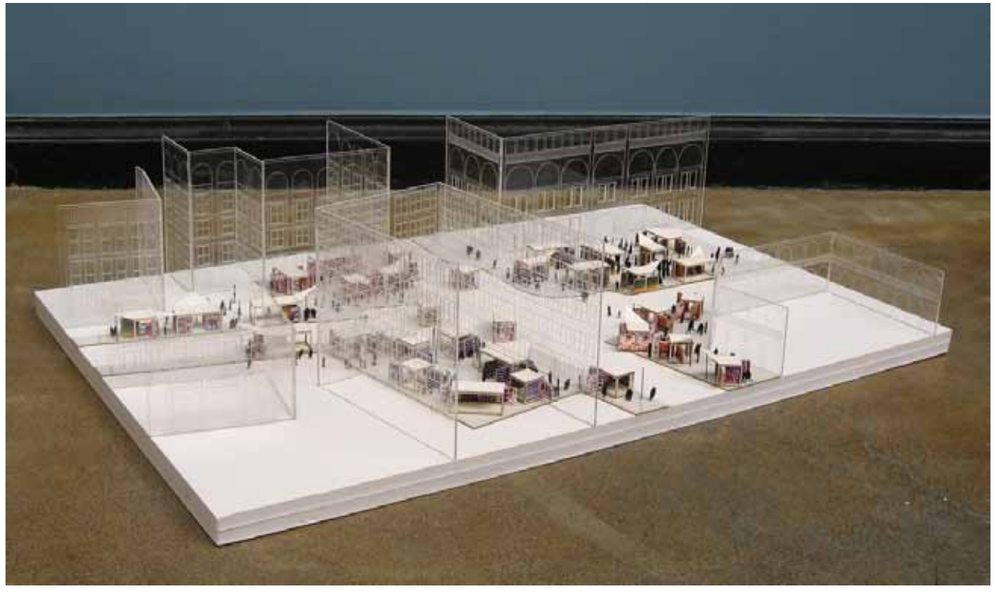
shelves can slide out and rotate to reconfigure the space around FlexPod



6 Final Thesis Defense
December 15, 2011

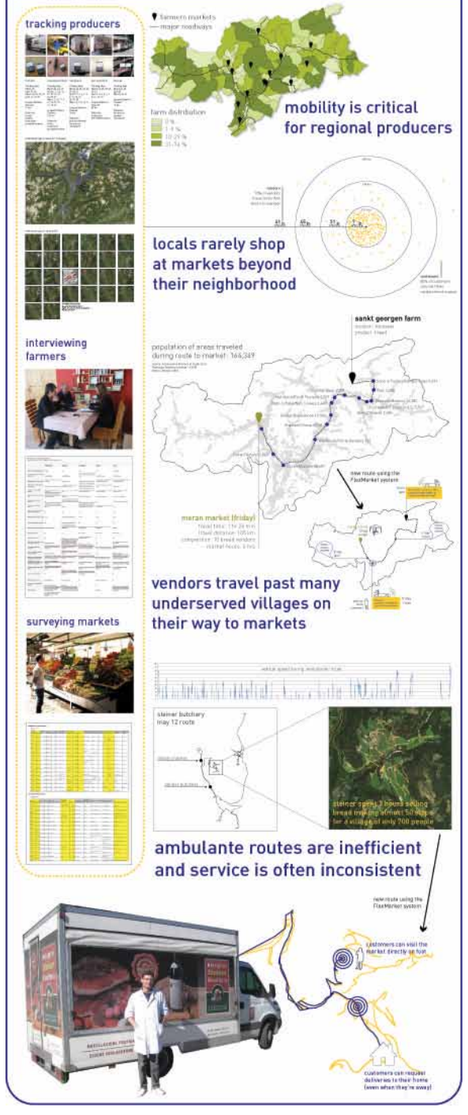
renderings of market clusters

model of market cluster on street corner

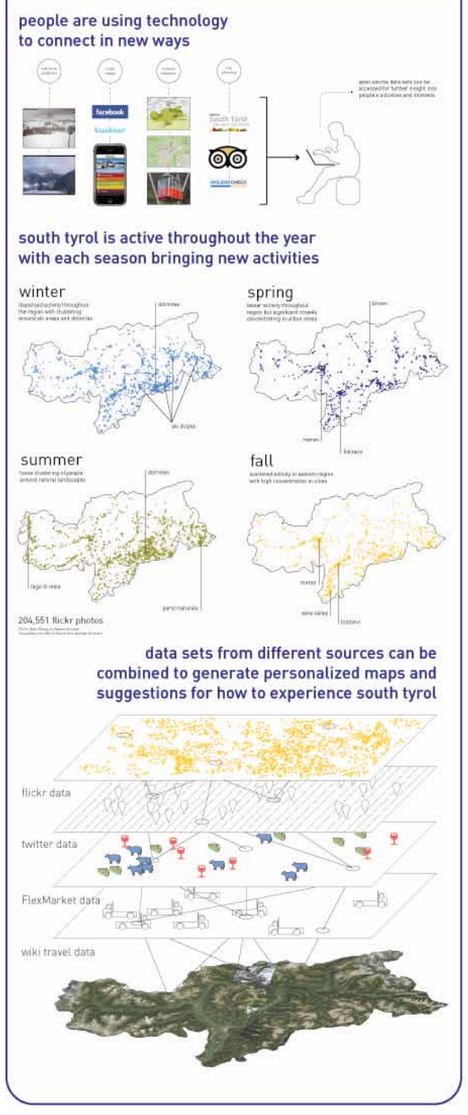


final presentation boards

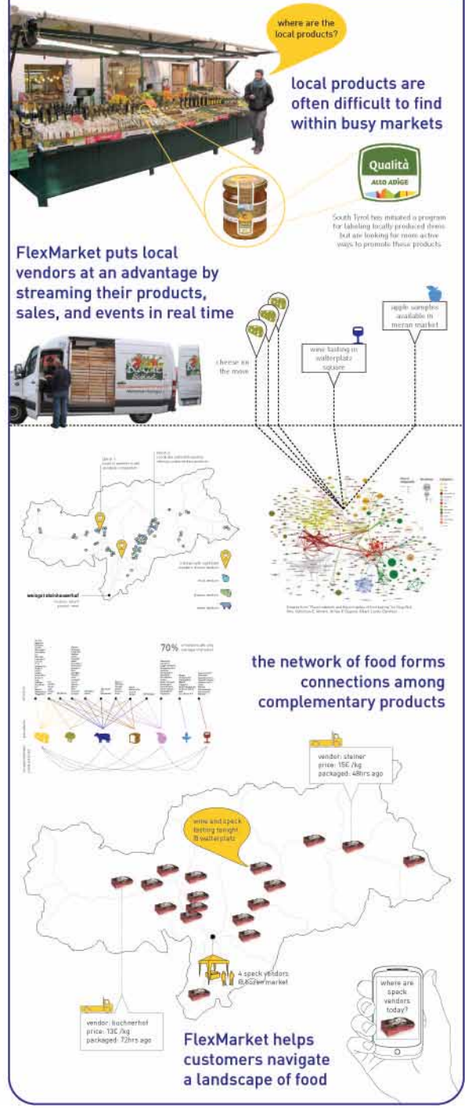
mobilize producers

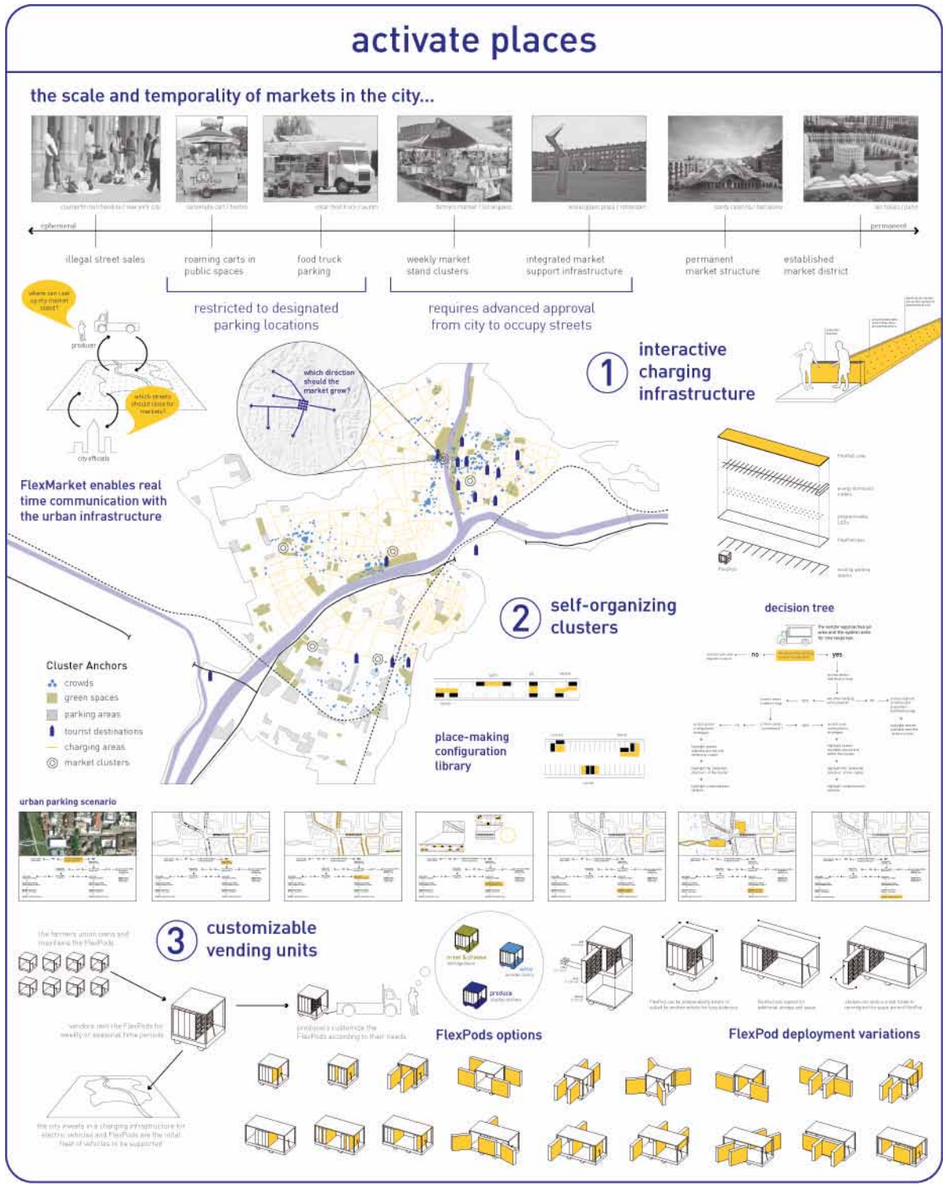


connect people



network products





Final Thesis Defense / December 15, 2011

7 Bibliography

D. Calabri. "The Market and the City: Square, Street, and Architecture in Early Modern Europe." 2004

L. Fontaine. "History of Pedlars in Europe." Duke Univeristy, 1996

J. Scott. "Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed." Yale University Press. 1998

C. Steel. "Hungry City: How Food Shapes Our Lives." Random House UK. 2008

M. Fujita, P. Krugman, and A Venables. "The Spatial Economy: Cities, Regions, and International Trade." MIT Press. 1999

J. McMillan. "Reinventing the Bazaar: A Natural History of Markets." London, 2002

I. Tinker. "Street Foods: Urban Food and Employment in Developing Countries." New York, 1997

S. Bhowmik. "Street Vendors in the Global Urban Economy." Routledge, 2010

K. Ryssdal. "The Food Truck Economy." American Public Media, Marketplace. July 2010

M. Wakefield, J. Castillo, and V. Beguin. "Transient Businesses: A Street Vendor Typology and Exploratory Study." Journal of Business and Entrepreneurship. 2007

C. McCarthy. "When Twitter Met Food Trucks." CNET, 2009

K. Beavon. "Central Place Theory: A Reinterpretation." Longmann, 1977

E. Ostrom. "Governing the Commons: The Evolution of Institutions for Collective Action." Cambridge University Press. 1990

E. Beinhocker. "The Origin of Wealth." Harvard Business School Press. 2006

S. Martinez, M. Hand, M. Da Pra, S. Pollack, K. Ralston, T. Smith, S. Vogel,
S. Clark, L. Lohr, S. Low, and C. Newman, "Local Food Systems: Concepts, Impacts, and Issues, Economic Research Report Number 97." United States Department of Agriculture. May 2010

G. Andrews, "The Slow Food Story: Politics and Pleasure". 2008: London, Pluto Press

K. Severson. "Eat, Drink, Think, Change." The New York Times. June 3, 2009

E. Scarpellini. "Shopping American-Style: The Arrival of the Supermarket in Postwar Italy." Enterprise & Society, Vol. 5 No. 4, Business History Conference 2004

M. Caputo, V. Mininno. "Configurations for logistics co-ordination: A Survey of Italian Grocery Firms." International Jounral of Physical Distribution & Logistics Management. Bradford: 1998. Vol. 28, Iss. 5; pg 349

J. Larson, E. Bradlow, P. Fader. "An Exploratory Look at Supermarket Shopping Paths." International Journal of Research in Marketing 22 (2005) 395-414

A. Picon. "Digital Cultures in Architecture." MIT Press, 2011

South Tyrol Research

A. Leonardi, "Sudtiroler Landwirtschaft zwischen: Tradition un Innovation." Bozen, 2009

P. Isenberg, MM, CT. "Alto Adige Wines." EOS, 2010

G. Crepaz. "South Tyrol: The Other Side of Italy." SMG, 2009
Tourismus in Sudtirol – Tourismusjahr. 2009/10

B. Prugger and A. Zuegg, "Sudtirol in Zahlen." SMG, 2009

L. Oswald, B. Moroder. "South Tyrol's Economy: It's Structure and Specific Features. Chamber of Commerce, Industry, Crafts, and Agriculture of Bolzano." 2006

Data Analysis

F. Girardin, A. Vaccari, and C. Ratti. "Uncovering the presence and movements of tourist from user-generated content." In 9th International Forum on Tourism Statistics, Paris, France. 2008

F. Girardin, F. Fiore, C. Ratti, and J. Blat. "Leveraging explicitly disclosed location information to understand tourist dynamics: A case study. Journal of Location-Based Services." 2(1):41–54. 2008

F. Girardin and J. Blat. "Place this photo on a map: A study of explicit disclosure of location information." Late Breaking Result at Ubicomp 2007.

T. Rattenbury, N. Good, and M. Naaman. "Towards automatic extraction of event and place semantics from flickr tags." In Proceedings of the 30th annual international ACM SIGIR conference on Research and development in information retrieval (SIGIR '07). ACM, New York, NY, USA, 103-110. 2007