



# THE ARCHITECTURE OF MARKETS

Comparing the organization of street market to the market building

AR2011- History Thesis By Oliver de Castro

## Abstract

Market structures have taken many forms. To understand the organization and architecture of markets, the research will question to which extent markets require the architecture of market buildings by studying the markets of the city of Rotterdam in the Netherlands. The street markets of Rotterdam have advanced at a steady pace and proved that the more organization was put into the street markets, the more it has depended on architecture with its own Markthal. The need for a market hall is mostly the need for sanitary improvements. One of the constant aspects of architecture for markets is that the stores are all connected to each other by some type of permanent structure. Nowadays these market structures can control the interior climate and provide proper facilities for the hygienic sale of food. The organization of the detachable street market stands can mimic most of the principles of the architecture of market buildings to sell ware in a safe and efficient manner, but its lack of facilities requires more effort from the vendors and its customers.

# 1. Introduction

*"Markets are socially constructed arenas where repeated exchanges occur between buyers and sellers under a set of formal and informal rules governing relations among competitors, suppliers, and customers."* (Fligstein, 2015). The market takes place in multiple shapes and forms. The structure of markets can evolve from sheets in a park to gazebo's on a public square and even to buildings specified for markets like the Markthal in Rotterdam.

Street markets achieve a sense of enclosure and interiority despite their usual outdoor locations, shifting form, and lack of built infrastructure which raises the question on whether or not street markets can be seen as 'architecture' and if the success of street markets relies on its lack of architecture. (Kelley, 2019)

Rotterdam has a rich history of trading thanks to its maritime location and is still a major logistic and economic center of the shipping industry in the Netherlands. The street markets of Rotterdam have existed since the start of the city and have developed along with its architecture into stores, shopping centers and eventually the famous Markthal by MVRDV. Despite the development of a market hall in Rotterdam, the street markets have continued to run successfully throughout the city. This makes Rotterdam the perfect location to analyze the architecture of street markets.

To understand the organization and architecture of markets, the following research question will be posed: *'To which extent do markets require the architecture of market buildings?'*. The research will start by understanding how the street markets of Rotterdam have developed to a market hall. This will be followed by a chapter defining the architecture of market buildings and their benefits. The final chapter will describe the organization of the street market and how this can be compared to the architecture of market halls. The research is relevant because it puts into perspective the changes and developments that markets have gone through, to understand the organization of markets and how this could potentially change in the future.

The research question will be answered with the help of literature, archive images, self-made photographs and case-studies. The city of Rotterdam will be used as a case-study along with its street market, the Binnenrotte market, and its market building, the Markthal. The essay will make use of literature to tell the story of how Rotterdam started and developed throughout the years and make use of archive images to see how the development of the city has influenced the design, structure and layout of Rotterdam's markets. The typology of market architecture will be defined by looking at the historical examples of market buildings. The Markthal will then be analyzed to understand the benefits of architecture for markets. The essay will end with an analysis of the street market at its current state, with site photos, to understand what architectural elements are needed to keep the markets running. Finally the research, analysis and comparisons will be summarized and concluded to answer the research question.

## 2. The architectural development of markets in Rotterdam

### 2.1 The origin of Rotterdam

To understand the development of street markets in Rotterdam, we must start at the beginning of Rotterdam. Rotterdam is a city in the Netherlands that was founded around 1270 when residents of the area around the river Rote started building a dam. The Netherlands has a strong connection with water with three major rivers crossing the country; the Rhine, the Meuse and the Scheldt. The Netherlands consists of 4.400 km of navigable rivers, canals and lakes. Rotterdam lies along both banks of the Nieuwe Maas River, which is connected to the Rhine River. Although the people of Rotterdam initially lived from fishing, the city soon became a trading point thanks to its maritime location (van Ravesteyn, 1933, pp. 7-9). This is the reason why Rotterdam is such a relevant city for this research.

The beginning of the seventeenth century brought new ports to Rotterdam. The city grew into an important trading place for agricultural products and wool. Farmers, fishermen and tradesmen would bring their merchandise to the city via the water. The city was filled with trading ports like in fig. 1, which were named after the product that was traded (van Ravesteyn, 1933, pp. 7-9). The fish market is one of the oldest documented trading ports of Rotterdam which seems to be a place where traders would sell their fish from off the floor.



Fig. 1: The fish market  
Illustration retrieved from Collectie Stadsarchief Rotterdam. Nr: XIV-54

## 2.2 The first markets of Rotterdam

Rotterdam has a rich history of trading, yet the oldest known market that received official status was the market by the Botersloot in the old center. The Botersloot was a canal in the center near Blaak and owes its name to the dairy farmers who brought their wares to the city via the Rotte (Vocke, 2019). The name is literally translated to butter canal. As you can see in fig. 2 this market wasn't only for dairy farmers, it's handy location also brought livestock and produce. This image really shows the different ways that trade was sold. Some of the tradesmen brought their products by carts or boats and would set up next to their vehicles with baskets and trailers. In the image there are also personalized wooden stands, with a table and shelter constructed to facilitate its trade while the livestock was tied to poles. It seems as though everyone constructed their own way to sell their products, dependent on what that product was.



Fig. 2: The market by the Botersloot  
Illustration retrieved from Stadsarchief Rotterdam. Nr: RI-746

In 1866 the municipality of Rotterdam decided to fill in the water of the Botersloot, but the market remained. The market grew by merging with the nearby trading points of the Binnenrottehof and Meent into the Grote Markt (Vocke, 2019). The Grote Markt, meaning big market, was the first market to feature the trade stands shown in fig. 3. The stands consist of a wooden construction covered with a sail for roofing with wooden tables and carts for the products. The similarities between the different market stands suggests organization for the market and its construction.



**Fig. 3:** The Grotemarkt  
Retrieved from Collectie Stadsarchief Rotterdam. Nr: RI-336

The commodity market was located on the Botersloot up until 1904. The market then moved to the Goudsesingel with an estimate of about 1200 stalls ('Market on the Binnenrotte', 2015). As seen in fig. 4 the market stands of the Goudsesingel market were constructed into rows, creating a lane for the consumer to walk through. The organization of the market slowly started mimicking aspects of a building with lanes that resemble a hallway.



**Fig. 4:** The market of Goudsesingel ca. 1904.  
Retrieved from Collectie Stadsarchief Rotterdam. Nr: IX-938-01

### 2.3 The rebirth of Rotterdam

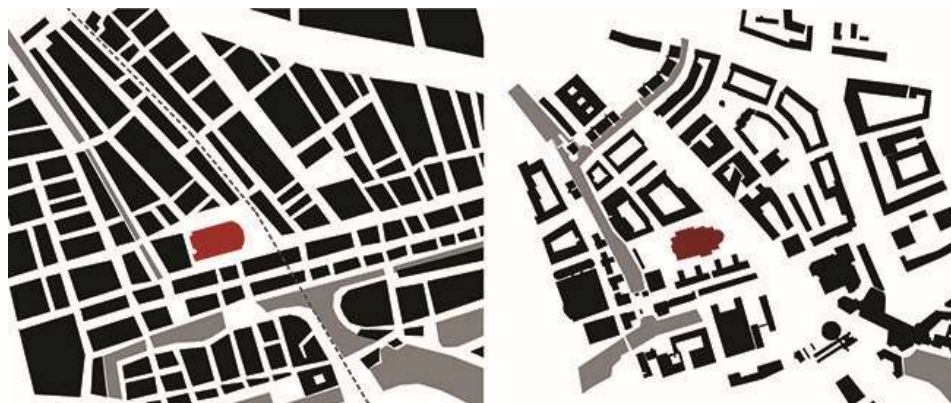
The Second World War was a major defining moment for the ultimate composition and appearance of Rotterdam. When the Second World War started, the Netherlands had firmly opted for neutrality. The German military had other ideas and planned to take over Rotterdam. Rotterdam was of major strategic importance to the Germans due to it being the largest industrial center in the Netherlands. On May 14<sup>th</sup> 1940 when the Dutch military refused to surrender, the Germans decided to drop their bombs on the city (Brongers, 2004).

Bombs were mainly dropped on the medieval city center and the residential areas of Kralingen and. The buildings immediately went up in flames and spread uncontrollably across the city center, merging into a firestorm. Around 2.6 square kilometres of the city was destroyed as seen in fig. 5 (Brongers, 2004).



**Fig. 5:** The city of Rotterdam after bombing  
Retrieved from U.S. Defense Visual Information Center. Nr: HD-SN-99-02993.

Due to the extent of damage from the bombardment and the resulting fire, an almost immediate decision was taken to demolish the entire city center with the exception of key buildings like the Laurenskerk church, the Beurs, the Rotterdam old city hall and the Rotterdam old central post office. The city's destruction was the perfect opportunity to rectify many of the problems of industrial pre-war Rotterdam, such as crowded, impoverished neighborhoods, and to introduce broad-scale, modernising changes in the urban fabric. Most of the old city's structure and layout was held on to and integrated into a new plan with widened streets and sidewalks as can be seen in fig. 6 (van Schilfgaard, 1987, pp. 9-13).



**Fig. 6:** City structure of Rotterdam before and after the bombing  
Retrieved from <https://dailyhive.com/vancouver/rotterdam-cycling-photos-video>

After the bombing, the market moved to the Noordplein. The market was organized along with the ideals of the reconstruction of the city. It became a fresh, orderly market, with six-meter-wide lanes between the stalls, while the textiles, food and other products were carefully grouped ('Market on the Binnenrotte', 2015). The market layout has adapted to the different locations and structures of the city of Rotterdam.

In 1958 the weekly market returned to its original spot on the Binnenrotte in the city. With 465 stalls and an average of 70.000 visitors; it is the most famous market in Rotterdam ('Market on the Binnenrotte', 2015). The Binnenrotte market multiplied the hallway of market stands from the Goudsesingel market into multiple lanes. These lanes were organized to fit within the larger structure of the Binnenrotte square. As can be seen in fig. 7 the construction is made up of bars that hold up the roof and table. The construction is symmetrical, yet each side is organized with its own function. The one side is meant for the visitors of the market, while the other side is used by the vendors.



**Fig. 7:** The lanes of the market stand  
Retrieved from Collectie Stadsarchief Rotterdam. Nr: XIV-133-03-09-1

#### 2.4 Organizing the street market

The organization of the markets in Rotterdam happen on multiple levels. Ultimately it is up to the council of the mayor and aldermen of the municipality of Rotterdam to organize the markets. Considering the fact that the market also offers the sale of food, European Hygiene Regulations need to be taken into consideration when organizing the market.

The number of market stands as well as the arrangement and layout is determined per market as indicated in the pitch plan accompanying these regulations. With these regulations the Council can determine per market: the number of market stands, the dimensions and layout of these stands, the layout of the market and a maximum number of stands per article group or sector. The layout of the market is usually determined per category or product (Gemeente Rotterdam, 2008).

The market regulations provided by the council are made to assign more responsibility to the market traders for the functioning of the markets, which allows the government to step back with regard to this economic activity (Gemeente Rotterdam, 2008). These regulations ultimately make sure the lay out of the market is as efficient as possible to avoid any problems during the trade of products.

When it comes to the production, processing and distribution of food, the market and its vendors must comply with the European Hygiene Regulations based on the basic principles of HACCP (Hazard Analysis and Critical Control Points). The HACCP is universally recognized and accepted as the method for food safety assurance (World Health Organization, 2021).

The food offered at the market must be safe to eat. That is why hygiene is an important point of attention throughout production, as well as the control of the raw materials and the logistics process. The HACCP process is used by the food industry to prevent the spread of foodborne diseases through juice, meat, poultry and seafood processing. The system maps the risks of specific food groups and describes how to control hazards in the individual links of the production chain (Nederlandse Voedsel- en Warenautoriteit, 2019).

The European Hygiene Regulations set a standard for the hygiene of the markets, while the council of Rotterdam provides a set of regulations for the organization of the market. The hygienic standards ensure the safety and validity of the products, while the council's regulations establish the validity and efficiency of the market. These regulations apply to the design and layout of the market and its stands. This proves that the safety, validity and efficiency depend on the organization of the design and layout of the street markets.

## 2.5 The market hall of Rotterdam

Due to a change in the European Hygiene Regulations, the outdoor sale of fresh produce like meat, fish and cheese had to comply with increasingly strict rules. This formed a problem for the fresh produce sellers of the street markets. The municipality of Rotterdam reacted to these regulations with a competition for an indoor fresh market (Fernández-Galiano, 2016, p. 76).

At this time the municipality was also encouraging the construction of more parking lots and luxurious homes to attract more inhabitants to the city center. This demand resulted in one of the most ambitious projects of Rotterdam and one of the most unique indoor fresh markets in the world. The building is composed of a huge market floor with food shops, restaurants and a supermarket covered by an arch of apartments (Aguilar, 2021).

The design was developed in 2004 by architect Winy Maas of MVRDV in collaboration with the developer Provast and is referred to as the Markthal (Fernández-Galiano, 2016, p. 76). The Markthal is now a permanent structure, which makes an architectural addition to the weekly street markets of Binnenrotte as can be seen in fig. 8





**Fig. 8:** The Markthal as part of the weekly market  
by Author

The city of Rotterdam is also planning to refurbish the Binnenrotte Square to make it more attractive even on days when there is no outdoor market. The refurbishment will rearrange the markets so that the market lanes connect the entrances of the Markthal. This will allow the public to easily enter and exit the building and to create incentives between the two markets (Aguilar, 2021).

The city of Rotterdam went from selling produce off the floor to having a world famous market hall as part of the weekly street market. Traders were responsible for providing their own structures to sell their products which evolved into diverse systems that were mostly detachable and easily transported. The construction of the market stands started looking very similar to each other, suggesting organization of these structures. The wooden structures and sail roofs were demountable and slowly constructed together forming lanes. The market proved the adaptability of its temporary constructions by reorganizing its lanes following Rotterdam's new city structure and the market's different locations. The organization and regulations of the design and layout of the street markets are there for the safety, validity and efficiency of the market. The temporary market stands eventually had to depend on a more permanent structure to follow these safety and health regulations. In conclusion, the street markets of Rotterdam have advanced at a steady pace and proved that the more organization was put into the street markets, the more it has depended on architecture.

### 3. Defining the architectural typology of markets

#### 3.1 The types of architecture for markets

Market architecture is defined as a joint building for a large number of individual shops. The need for numbers of separate market halls was a matter of the sizes of cities, and the need for buildings instead of open markets a matter of sanitary improvements in marketing food. (Pevsner, 1979, p. 238)

The first documented structure with multiple individual shops was in ancient Rome as part of the Imperial fora. The Imperial fora was a colossal structure that features a series of monumental fora (public square) that were the centers of politics, religion and economy in the Roman Empire. The Forum of Trajan, depicted in fig. 9, was one of these public squares which included in its structure 150 shops on various levels selling wine, grain and oil (Pevsner, 1979, p. 235). The market was not yet its own building, but instead made a part of the overall structure of the city center of Rome.



Fig. 9: Reconstruction of the assembly of the market of Trajan's Forum  
Retrieved from <https://statuiededaci.ro/en/trajan-s-forum/3d-models-and-reconstructions>

This idea of combining different functions in one structure was scaled down in the Western Middle ages. In this time the market and town hall would usually take place in one building, with the town hall above and the market on the ground floor. One example of this is the Halles in Bruges. The Halles had mercers, spicers and butchers selling ware on the ground floor, while festivities took place on the upper floor (Pevsner, 1979, p. 236). The market took place in the open halls of public buildings with multiple functions.

In Ghent however, the town hall and markets were separated. The markets in Ghent were not general markets, but specialized in ware like cloth or meat so the Cloth Hall, Meat Hall and Town Hall were all separate buildings. The market buildings were built specifically for these markets as rectangle halls where the trade was inspected and transactions were negotiated.



**Fig. 10:** The Cotton Market of Jerusalem  
Retrieved from [http://i2ud.org/i/html3/monuments/sites/t112\\_sua\\_al/PicTOC.html](http://i2ud.org/i/html3/monuments/sites/t112_sua_al/PicTOC.html)

Jerusalem also had a building specialized for the sale of one type of ware, yet this was not just an open hall (Pevsner, 1979, p. 235). The Cotton Market can be seen in fig. 10 and was organized as two rows of rooms (or stores) facing each other, connected by one roof. The connecting roof creates a hallway or street through the building between the rows of stores.

Another type of market is the open market area surrounded by booths or shops often connected by a cloister like the Fondaco dei Tedeschi in fig. 11. The renaissance architect Filarete designed his ideal market with this archetype. On the west side of the market stood the meat and poultry halls, with the slaughter house behind them, and on the south side is the fish market. A canal runs round the market to carry away the refuse. North had corn market and exchange, while the east side was for the brothel and bath house (Pevsner, 1979, p. 237). Filarete's design clustered the different categories of trade throughout the different booths of the market. The different types of food sold at the market were separated, probably to avoid food contamination. The hygiene of the market was not only managed by the organization of the booths, but also thanks to the addition of a water feature.

The market of Filarete also featured store rooms referred as fondaco's. The shops of the market needed a place to store their excess ware (Pevsner, 1979, p. 237). The store rooms can be assumed as a way to keep the shops tidy and organized.



**Fig. 11:** The Fondaco dei Tedeschi by Raphael Custos (1616)  
Retrieved from AKG-IMAGES Nr: AKG115989

The English architect Charles Fowler made his own attempt at designing a market. Fowler designed the Covent Garden Market to regulate the messy market dealings happening on that square. His design had long ranges on an E-plan, which was three rows of stores that created two open squares between them (Pevsner, 1979, p. 238). This variant has elements of both the market hall and cloister type. In this case the open area is the hall and the cloister only goes around the three market sides with the roof connecting all the stores together.

Fowler had also made the design for the Hungerford market. The Hungerford market had a design similar to the market halls of the past. It consisted of three wide halls covered in iron and glass roofing. Although this variant turned out a failure, it was one of the first markets to feature iron and glass (Pevsner, 1979, p. 240).

At this time exhibition halls were also being built with the use of iron and glass (Pevsner, 1979, p. 240). The designs of market halls was comparative to the design of exhibition halls, since they were both big halls with different areas or rooms to either sell ware or display art. Reinforced concrete took the place of steel, having the advantage of combining the crushing strength of stone with the tensile strength of iron (Pevsner, 1979, p. 252).

The decoration, construction and material of market buildings changed over time to match the new construction and architectural trends. One of the constant aspects of architecture for markets is that the stores are all connected to each other by some type of permanent structure. The structures can be categorized as market halls, market hallways and open market areas surrounded by shops. The remainder are structures and buildings that combine these variants.

### 3.2 The architectural benefits of a market hall

To this day, each new market building can be categorized along with the above mentioned examples in history. However, the Markthal in Rotterdam features a combination of an apartment building covering a fresh food market with food shops, restaurants, a supermarket and an underground parking, which is found nowhere else in the world (Fernández-Galiano, 2016, p. 76). The Markthal is the first market building that combines a private building with a public function.

The Markthal in Rotterdam is a building that is composed of a 40 meter high arch, under where you can shop, park, eat out, sit on a terrace or even live. A secure, covered hall is nestled beneath the large arch, conceived as an entirely new take on a typical market building. The Markthal accommodates contains more than 80 fresh produce and catering businesses with built-in market stands. The sides of the arch also accommodate 20 retail units, restaurants and cafés (Fernández-Galiano, 2016, p. 78). The layout of the market combines the ideals of the market hall and the market hallway. The sides of the market are rows of stores, while the hall holds different market stands distributed across the hall.



**Fig. 12:** The Markthal ground floor plan

Retrieved from MVRDV on <https://www.archdaily.com/553933/markthal-rotterdam->

In the Markthal food can be offered in every conceivable form, which allows the visitors to complete their food shopping under one hygienic roof (Fernández-Galiano, 2016, p. 76). As seen in the floor plan of fig. 12 these food stalls are permanently built into the building, which means that the layout of these stalls could be perfectly designed to keep clean so that no contamination of food can occur. It also ensures that the merchants from the various branches of products complement each other well, not only for the user experience, but also to avoid cross contamination of the different types of food being sold.

The Markthal is designed with an open character to attract visitors. The single-glazed cable net façade, shown in fig. 13, keeps the ends of the arch as transparent as possible due to the ends having to be physically closed to provide protection from the weather (Aguilar, 2021).

The main reason the Markthal is so needed is its ability to control the interior climate. The Markthal is an energy efficient building, awarded a Very Good BREEAM rating. The thermic system of the building can function without any installations thanks to the glass façade. Fresh air flows in under the façade and rises towards the roof where it leaves the hall through the ventilation shafts in the roof. The hall is naturally ventilated, yet it has a central monitoring system that is used to exchange heat and cool air between the different programs. In this way less installations could be used than normal for these programs (Aguilar, 2021). The 40 meter high arches cover the market while the glass façade controls the interior climate from any weather influences that could influence the food.



**Fig. 13:** The arch and façade of the Markthal  
by Author

The distribution activities that occur for the market stands and stores happen in the basement to avoid the inhabitants of the Markthal being hindered. In the basement is also where the waste is managed. The garbage pickup is organized through an underground tunnel leading to hidden elevators at Binnenrotte square, in this way garbage trucks can operate in distance to the hall. The garbage in the Markthal is separated and managed for the entire building. The building also features public restrooms on the first underground level (Aguilar, 2021). The proper organization of waste disposal ensures proper hygiene in the building and in this way avoids food contamination.

The Markthal accommodates various fresh produce and catering businesses with the use of built-in market stands and units for restaurants and cafes. The layout and organization of the food stands are designed to avoid any type of contamination of the food. The interior climate for these market stands can be controlled thanks to the 40 meter high arches and the glass façade, which help keep the food in a proper climate. Facilities like the proper organization of waste disposal ensures proper hygiene in the building and in this way can also avoid food contamination. In conclusion, by turning the market into a permanent structure, facilities can be built to follow all the necessary guidelines of selling food.

## 4. The organization of the Binnenrotte street market

With over 250 stalls on Tuesdays and Saturdays, the street market of Binnenrotte, Rotterdam is one of the largest market in the Netherlands.

You can go to the Binnenrotte market for fresh fruit, vegetables, fish, cheese and all kinds of other daily groceries. You have also come to the right place for flowers or plants. Visit one of the many clothing stalls or buy a beautiful piece of jewelry. Even if you need furniture, you can go to the second-hand section of this market (Blom, 2009).

This market takes place on the Binnenrotte square twice a week. Like most temporary markets, its construction is detachable thus it can be set up and deconstructed in a quick manner. This structure is provided by the council of Rotterdam. The market stands are constructed by the metal roof structure shown in fig. 1 and various other elements like the roof and table constructions shown in fig. 14. These are brought to the square on the trailers shown in both figures.



**Fig. 14:** The metal construction of the street market  
by Author

The layout of the market strongly determines the appearance, hygiene and thus the success of a market. Different setups can be used on the market. The most common setups are the ribbon setup and the square setup. In the ribbon arrangement, the merchants stand side by side, in single or double rows. The square arrangement has stalls in the shape of a square (Blom, 2009). The market of Binnenrotte is shown in fig. 15. The council arranged the market to mostly follow the ribbon arrangement, which has a similar idea as the market hallway of the previous chapter. The stands create 4 rows of market stands and 2 lanes for the consumers that are all parallel to the lanes of Binnenrotte. At the further end of the market and where it crosses with the Hoogstraat, the rows are more fragmented into a few individual stands. The market layout is adjustable to its urban context by following its gridlines and opening up where it needs to.





**Fig. 15:** The Binnenrotte market and its urban context

Retrieved from <https://www.aerophotostock.com/media/75176744-c487-11e3-a0dd-f2b86e40979d-rotterdam->

The reason there are 4 rows of market stands and 2 lanes for the consumer, is so that there is a front and backside to the market stand. The back side of the stand is where the trader takes place along with the storage area of their products and/or their vehicle. With this layout the products and distribution of the products do not cause any nuisance or restrictions for the market and its consumers.

The layout of the market can make an important contribution to consumer attractiveness. Consumers indicate that a large degree of variation has a positive effect on the attractiveness of the market (Blom, 2009). By virtue of the European Hygien Regulations, industry-specific requirements must be taken into account. Like the market design of Filarete, the different types of food sold at the market were separated to avoid food contamination.

The main point is that the merchants from the various branches complement each other and are not a burden to each other. For example, it must be prevented that a textile trader is placed next to a fishmonger. This permanent setup can also be beneficial because consumers can get used to the setup (Blom, 2009).

The market is made out of market stalls, sales trolleys and food trucks. The standard width or front length of a farrowing place is at least 4 meters. The depth of a stall is at least 3 meters. The walking space between the two stalls, measured from the roof, is at least 2.5 meters for stalls or buildings running along

the market. The width of the main paths must be at least 4 meters. A different width is possible for ground spaces or sales vehicles. The walking height of a stall must be at least 2.1 meters (Blom, 2009). All this is necessary because the regulations imposed by the council and the HACCP must be taken into account. A proper amount of space can help keep the market stands hygienic for the sale of food.

Nowadays, the markets also rely on sales vehicles like food trucks partly for hygienic reasons. The admission of food sale is a necessary condition to be approved on. The structures provided by the council are less hygienic in the sense that they are constantly being touched, changed and transported by various people (Blom, 2009). The food vehicle is a structure in which its layout can be designed for food storage and display. A sales vehicle can also provide electricity which brings the ability to have cooling for the food. As you can see in fig. 16 the front part of the food truck that holds and display the fish, is also a cooling facility.



**Fig. 16:** The fish sales vehicle  
by Author

When it comes to dealing with waste on the market, the regulations state that the vendors who are allowed to prepare or sell small food and drink products from their stand are responsible for their own waste as well as the waste of their customer. These market stands must have two bins or similar objects at the front of the establishment, in which food scraps, packaging material and other waste can be disposed. Before leaving the market area, the vendor is responsible to make sure his market stand and its immediate surroundings are clean and takes care of the disposal of the bins and their own market waste (Gemeente Rotterdam, 2008).

The presence of public toilets and running water in larger markets is also necessary for proper hygiene (Blom, 2009). Unfortunately, the lack of bathrooms on the Binnenrotte market causes visitors to have to make use of the toilets of surrounding cafes, restaurants or the Markthal.

The market stands can be set up and deconstructed in a quick manner. The market is laid out to react to its urban context by following the city's gridlines and opening up where it needs to. The layout of the market is set up so that the products and distribution of the products do not cause any nuisance or

restrictions for the market and its consumers. A proper amount of space and sizing for the market stands can be adjusted, which helps keep the market stands hygienic. Although a market stand is usually not provided with electricity for food cooling, this can be provided with a sales vehicle. The sales vendors are responsible for the management of waste, while the costumers are responsible to find their own bathrooms. In conclusion, the organization of the detachable street market stands can mimic most of the principles of the architecture of market buildings to sell ware in a safe and efficient manner, yet its lack of facilities requires more effort from the vendors and its customers.

## 5. Conclusion

The city of Rotterdam went from selling produce from off the floor to having a world famous market hall as part of the weekly street market. Vendors were responsible for providing their own structures to sell their products which evolved into diverse systems that were mostly detachable and easily transported. Once the organization of the markets started and more vendors wanted to sell their products, the market stands started connecting and creating lanes. The market's layout proved to be adaptable to Rotterdam's new city structure and the different market locations.

The organization of the market includes hygienic standards to ensure the safety and validity of the products, as well as council's regulations to establish the validity and efficiency of the market. These regulations apply to the design and layout of the market and its stands. The organization of the markets has steadily lead the street markets of Rotterdam to depend on the architecture of the Markthal.

The architecture of market buildings has developed with different shapes and sizes. The main element of architecture for markets is that the stores are all connected to each other by some type of permanent structure, while the function of the matter is a matter of sanitary improvements. The different types of market buildings are market halls, market hallways, open market areas surrounded by shops or a combination of these types.

The Markthal accommodates multiple fresh produce and catering businesses, along with restaurants, cafes and a supermarket. The organization of these market stands have been determined and are permanently built into the building to follow current regulations of markets along with the facilities needed. By turning the market into a permanent structure the efficiency, safety and validity of the markets can easily be controlled.

The shape and form of the Binnenrotte market have been organized to follow the current market regulations regarding safety, validity and efficiency. With the construction of markets being detachable and adjustable, the design and layout of the market has also been organized to follow the regulations. The structures of the market being temporary is what makes it so adaptable. The efficiency, safety and validity of the market can be controlled with these temporary structure, but the lack of facilities requires more effort from the vendors and sometimes even the costumers.

In conclusion, the organization of the markets can achieve similar results to the architecture of markets when it comes to the safety and validity of selling ware, yet market architecture proves to be more efficient.

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