

Urban programming research aims to generate knowledge and data as input for the urban programme of requirements. Usually the urban brief focuses on the functions and measures in the urban plan. The quantitative programme of requirements determines what the design must realise. Qualitative aspects may concern liveability, sphere, safety, sustainability and so on. An urban planning programme can be written with or without research. Here, we assume that research plays a part. A research based programme of requirements does not come out of the blue, nor is it solely based on a normative idea of city form and function, but the contents are based on careful studies or well sustained argumentation. The next two paragraphs discuss characteristics of the brief and the focus of programming research. Next, two examples are described: the programming of amenities and of businesses. We end with concluding remarks.

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28.1 ASPECTS OF THE PROGRAMME OF REQUIREMENTS

The programme of requirements depends on the actual context of a plan or design. Four aspects are useful as criteria for the discussion about the contents of the programme.

a. *Type of assignment*

A programme can be determined for a newly to-be-built area, but also for an existing built situation. The programme for a 'new' area may benefit from the results and information of ex post research in other, comparable situations concerning the functions and measures the urban plan has to meet. For an existing area the situation is different. There, the built environment can be described in terms of the realised, existing programme and the developments afterwards. Research of its effects may clarify the formal and functional defects and positive points. This existing programme forms the start of the re-programming. The new programme can be based on the effects of spatial interventions elsewhere, and contains necessary adaptations, improvements and modernisations.

b. *Programme elements*

The elements of the urban programme are derived from the desired functional-spatial organisation. They can be expressed in a quantitative and qualitative way. Reference images can be used as illustration or guideline. Programme elements concern structure of the area, functions and form:

The *structure* includes infrastructure and the structure of amenities, green and water. The structural part of the design is the well-considered composition of these component structures.

The *functions*, like housing, amenities (shops, restaurants, schools, hospitals, theatres) and workplaces, can be classified in several ways. With respect to amenities one can discern for example free and compulsory, mono- and multi-functional, competing and complementary amenities. The functional part of the design concerns the well thought out tuning to each other. The functions in a plan area can be on one hand the ('autonomous') starting point, for instance the amount of houses; on the other the 'derived' functions (e.g. amenities) based on the population in the given amount of houses. This relationship can be expressed in indicators (rules and numbers of thumbs) for instance: x m² per inhabitant. It must be emphasised that one should be very careful in handling these rules of thumb. There can be great differences between actual situations (see below: programming of amenities).

The programme must also express the demands about the actual number and *form* of the buildings and outdoor spaces, leaving space, however, to the creativity of the designer.

c. Functions and questions

The functions mentioned can be divided into categories, for instance according to the CIAM-classification. With respect to them several questions need to be answered:

Housing: How many houses and which types are needed and for whom? Which density shall be used, and why?

Employment: Which type of activities can be included in the planned area? Where? What are the advantages and disadvantages? What are the requirements of the businesses themselves, and the wishes of inhabitants with respect to companies? Aspects that can play a rôle are diversity, identifying marks, liveliness and the presence of facilities.

Amenities: Which amenities (shopping centres, schools, sports centres, playgrounds, churches, social and cultural amenities, recreation areas, hotels, restaurants, hospitals, entertainment centres) are needed, and how many? Just for the people in the area itself, or also for people living in the surrounding neighbourhood, visitors, and tourists?

Traffic: Which road structure, parking, type of public transport and so on will be required? How can the modal split be influenced?

d. Dealing with uncertainty

If the outlines of the plan are clear and the programme ready, it can be worked out in a design, for example a certain density of houses, and an amount of amenities. However, one problem might be how to deal with uncertainties about the specific organisation or the future developments. In the case of uncertainties the solution is to reserve space for a specific function.

28.2 FOCUS OF PROGRAMMING RESEARCH

The focus of programming research depends on the need for information and the decisions to be taken.

a. Demand or supply

The programme can be determined from the demand side. Generally, the preliminary magnitude of the demand is determined with the help of index numbers (rule of thumb (planning)): simplified rules and relations between variables, based on general research.^a However, general index numbers do not take into account the specific information of a particular local situation. So one should be very careful in handling these index numbers. If one does not take into account from what situation the rule of thumb is derived, great planning misfits may occur. An example: a ratio between space for parking and space for shops in a shopping centre was used for a centre planned in a new town in The Netherlands. Later on, it turned out that the ratio was derived from a situation of a different type of shopping centre in the United States, where the modal split is totally different, and where cars are larger than in the Netherlands. Also the type of shopping centre plays a rôle, because of a possible difference in average duration of the visit. The longer the visit, the more space for parking is needed. Another example: one cannot use a fixed ratio between number of inhabitants and the number of m² shopping space. The ratio depends on what the influx or outflux of purchasing power is. Rules of thumb can only give indications of what is needed to some extent.

With respect to the actual programme in a particular planning situation, information can be obtained by research in that area, by observations, interviews with key persons and discussions with clients. Nevertheless, uncertainty will remain to some extent. It is important to handle this uncertainty by scenarios^b, monitoring and flexibility in the design (see Hulsbergen and Van der Schaaf on ex ante research on page 159).

a NIROV (1988) *Planologische Kengetallen 1988-2001* (regularly revised).

b Draak, J. den (1993) *Van blauwdruk naar draaiboek, scenario's in de ruimtelijke planning en volkshuisvesting*.

Programming research can also start from the supply side. In the inter-action between programme and design the programme possibilities can be explored. One must bear in mind that

for certain elements a “critical mass” must be part of the evaluation of the outcomes. This is a kind of research with the help of design (design study / study by design), where designing is interpreted as hypothesis. An example of a plan in which the design was determining the programme is the well-known Kop van Zuid in Rotterdam. In this context we can point out the difference between programmes that are following existing trends and task setting programmes. The task setting programmes relate to programmes, that are greater than the estimated need for a certain location, for instance based on considerations on a higher scale level. The design can be a means to show the potentials of an area, and be used to approach or even reach the chosen goals.

b. Present or future situation

Programming research not only concerns estimation of future developments, for instance population growth and income growth, but also analysis of the way certain amenities, for instance a shopping centre, function now and in the future. Synergy between several kinds of amenities, financial feasibility and location play important rôles. It is also possible that an amenity is placed not only because of the need for this amenity as such, but because of other purposes: e.g. fighting deterioration, vandalism and criminality.

c. General or specific plan orientated research

Programming research can focus on general questions and general knowledge. For instance: how is the development of the demand for offices? What are important factors determining the location of businesses? On the other hand, programming can focus on a specific plan. What are the needs of prospective tenants (see also paragraph 1c)? An interesting question for ex post evaluation is for instance: which similarities and dissimilarities turn out between expectations, ambitions and planning tools (like index numbers) in advance, and actual use and perception of a certain area? How did the design function? This knowledge may be used to improve the area itself, but also to add knowledge to the existing ‘body of knowledge’, as input for a particular urban brief or to include in the decision-making process.

d. Financial aspects

The rent to be paid is one of the factors influencing the choice of businesses and amenities for a specific location. Industries needing a lot of space especially will pay much attention to the price of the land. Businesses and offices that can afford to pay high rents push away weaker functions from preferred locations (displacement). In areas preferred by functions that can afford to pay high prices, the ground exploitation is no problem generally. In case of ground exploitation problems in a certain plan area, the local government can decide to absorb functions (offices, amenities) that can pay higher prices.

e. Methodological aspects

Firstly it should be taken into account that the results of research may be rough or detailed depending on the phase of the planning process. This means that the research outcomes may differ in desired precision, reliability and range of the results. However, the information must always be collected and analysed properly. The conclusions must be based on the information used. The approach can be empirical (statistics, inquiries, interviews and observations) or with the help of models, for instance mathematical formulae describing reality in simple terms. Examples of models are gravity models or models that describe the division of purchasing power in a region or city. Whatever the method, one should be very critical with respect to the reliability of the used information (for instance based on inquiries, interviews), and the application of outcomes.

28.3 PROGRAMMING OF AMENITIES^a

Programming research with respect to amenities needs understanding the phenomenon in question. The concept of the supply structure: the network of the amenities in relation to the consumers is important. This structure has several levels (the quantitative and qualitative composition of the set of amenities), and a range for each level. The structure is determined by factors like: population structure (age, households, religion), social and economic situation, and spatial situation. The scale and quality of the amenities in an area are determined by the amount of people using the amenity and its frequency. In this respect the relation between the level of the amenities and the reach is important. The higher the level the wider the reach. On the other hand, the higher the frequency of use, the smaller the reach must be. The maximum distance a consumer considers acceptable to reach an amenity depends of the type of amenity, frequency, transport possibilities and subjective perception. The reach of an amenity influences the chosen means of transport. In case the amenity is very near, it can be reached on foot or by bicycle. Further away car or train are needed. This is also related to the category of visitors (old or young) and availability of the means of transport. On the supply side the minimum turnover, necessary for the amenity (for instance a shop) to be profitable is important.

As mentioned before amenities can be divided into ‘compulsory’ and ‘free’ amenities. In case of ‘compulsory’ amenities (schools, medical care) the need for them can be estimated fairly easy. In the case of “free” amenities visiting is without obligation, so that estimating the need is more difficult and uncertain. Factors like distance, quality and alternatives play their rôle.

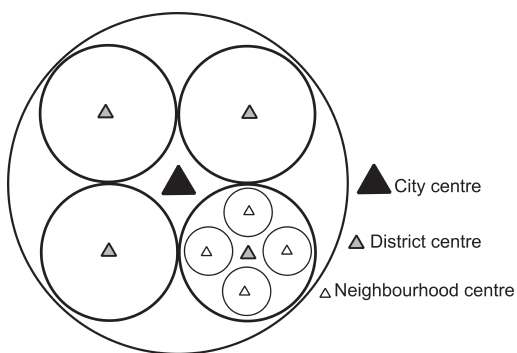
28.4 EXAMPLE: PROGRAMMING OF SHOPPING CENTRES

The retail structure has two characteristics:

- a) shops are concentrated in shopping centres;
- b) centres are ranked in a hierarchy.

a) Concentration takes place in order to achieve a certain attraction to the shopping centre. The consumer can buy several articles in one trip (one stop shopping) and can compare goods and prices. By combining shops with amenities like restaurants, pubs, post offices, etc., and by designing a promenade with terraces, fountains, an attractive atmosphere can be created. Concentration makes it possible to connect the centre with public transport.

b) The shopping centres form a hierarchy (see figure 286) based on classification of goods in several types. This functional hierarchy is an application on structures *within* a city or town of Christaller’s^b ‘central place theory’ that explained an *interlocal* hierarchy of communities. The functional hierarchy means that each type of shopping centre is specialised in certain types of articles, and has her own market area. In the city centre, with a function for the whole town, durable goods can be bought, and in the smaller centres in the neighbourhoods the frequently purchased articles (by people who live in that neighbourhood). In recent years the hierarchy is adapted by small selling points in fuelling stations (related to traffic) on the level of the neighbourhood, and megastores on the periphery of the town.



286 Hierarchy and dispersal of shopping centres

- a Guyt, P. (2000) *Voorzieningen, Ruimtelijke Planning Monografie 4*.
- b Christaller, W. (1933) *Die zentralen Orte in Süddeutschland: eine ökonomisch-geografische Untersuchung über die Gesetzmässigkeit der Verbreitung und Entwicklung der Siedlungen mit städtischen Funktionen*. English translation: (1966) *Central places in southern Germany*.

the total expenditure of the inhabitants of a neighbourhood is spent in the neighbourhood, 50% in the district and 90% in the town.

The scope of the shopping area is determined by dividing the turnover in a shopping centre by the required turnover per m². In order to estimate the turnover of a shopping centre one can use empirical approaches like consumer inquiries, visitors inquiries and retailer inquiries. Each approach has its advantages and disadvantages. It is also possible to use models, like individual choice models (predicting consumer behaviour) and spatial inter-action models by which it is possible to estimate the effect for existing shopping centres when a new shopping centre will be built. Models used in the planning of shopping centres are based on the gravitation model of Newton, in which the reach of a shopping centre is the result of the attraction of that centre and the distance to that centre.

This formula gives the division of expenditure from j to i and k:

$$K_{ji} / K_{jk} = B_i / B_k \times (d_{jk} / d_{ji})^2,$$

In which:

- K_{ji} = amount of expenditure from j orientated on i
- K_{jk} = amount of expenditure from j orientated on k
- B_i = population of i
- B_k = population of k
- D_{ji} = distance between town j and i
- D_{jk} = distance between town j and k

With respect to shopping centres, the question is how they should be organised and designed. Programming research should give the information needed. Items like acceptable distance between parking place and shopping centre, a good mix of branches, and effective routing, are important for designing a well-organised shopping centre. There is a relationship between the size and type of the shopping centre. Small centres have the form of a strip or a court, big shopping centres are clustered in malls.

Because of some developments, for instance, the diminishing size of a household and changing shopping behaviour (caused by increasing mobility, other preferences, technical developments, teleshopping), the position of the neighbourhood centres changes. Some centres will vanish. It is expected that the shopping structure will become less dense.^a On the other hand, we see small shops linked to fuelling stations and train stations, related to traffic flows. Because of lack of space in city centres, new types of shopping centres (Large-Scale Retail Establishment) arise at the edge of town (see figure 287). As a result of a more efficient purchasing policy of the shopkeeper, the turnover per m² will increase.

28.5 EXAMPLE: PROGRAMMING OF BUSINESSES

The employment in a region or town is strongly influenced by the current economic situation. The structure and composition of the employment changes with economic and technological developments. In contrast to amenities, the programme for businesses in a planned area is not dependent in the first place on the size of the local population, but on the attractiveness of the local area for businesses. It is based on several factors influencing settlement of firms and offices: quality of the location, reputation, acquaintance with the location by businesses, social climate, co-operation of local government and many other factors.^b In determining the programme not only the preferences of the firms themselves play a rôle but also the wishes of inhabitants (who do not like the hindrance of the adjacent businesses) and local government policy. Because of the variety in potentially relevant factors that may be important for the various types of firms, different types of locations (industrial areas, business parks, office concentrations, small business areas in residential quarters) are discerned



287 Large-Scale Retail Establishment Alexandrium II in Rotterdam North East

BOX 1: Example of determining the amount of parking place for a shopping centre

The required number of parking places depends mainly on the type and area of the shopping centre. The greater the shopping centre, the greater the reach and the greater the number of visitors that travel by car. This example refers to a city centre on Saturday, because then the maximum number is needed.

Area of the shopping centre is 100.000 m² floor space (accessible for the visitors) exclusive 50.000 m² storage and office space.

The estimated number of visitors on a Saturday is 150.000

Assumption: 1/3 travels by car = 50.000 people.

Assumption: average two persons per car, so 25.000 cars are expected on a Saturday.

The parking time is depending on how long visitors are staying in the shopping centre. This determines the circulation factor, i.e. the average number of cars on a parking place. If this factor is 5, than the number of parking spaces is 5.000.

The visitors are not equally divided over the day, so that an extra amount of e.g. 1750 places is needed for the period between 13.00 and 16.00, so in total 6.750 places have to be available.

For people working in the shopping centre 1500 places (1 parking place per 100 m² space) are needed.

Parking area needed for visitors is

$$6.750 \times 25 \text{ m}^2 = 168.500 \text{ m}^2$$

and for employees 1.500 x 25 m² = 37.500 m²

so that in total 206.000 m²

parking lot have to be planned for the shopping centre.

(The amount of parking spaces per 100 m² shopping area can differ with the type of shopping centre).

a Toorn Vrijthoff, W. van der, H. de Jonge et al. (1998) *Werk aan de winkel. De toekomst van de winkelmarkt 1995-2015*.
 b Guyt, P. (2000) *Bedrijvigheid, Ruimtelijke planning Monografie 3*.

and developed in cities and towns. Attempts are made to match different types of locations with types of businesses that are possible or desired in the various locations. It can be used in the development of a spatial policy local government wants to pursue. Municipalities also make use of estimations of the future employment, using instruments like models, inquiries, extrapolations and planned goals. The number of workers has to be divided by the number of workers per m² to calculate the space needed.

For offices the floor space needed depends particularly on the type of employment in offices and space per employee. The size of the employment in offices depends partly on the size of the local population. But, offices can also be established there because of specific advantages. Important factors are accessibility by car and public transport, parking space, and prestige of location and building. The ground space needed depends on the number of floors, and the ratio of the built and total area (ground-space-index). Example: 5000 employees have to be accommodated. Every person needs 30 m², in total 150.000 m² floor space. If the number of floors is 10, the built area is 15.000 m². If the ground-space-index is 20-100, the ground area is 75.000 m². The floor-space-index is 2,0 (150.000 / 75.000).

	Building form	Density	Image	Nearness amenities	Public transport	Attainability by car
1 Office boulevards	h / m	z	++	++	++	+
2 Other centre	m	i		++	++	+
3 Junction locations	l / m	i	+	+	+ / ++	++
4 Offices in neighborhoods	l	e			+	
5 Offices on industry and harbour sites	l	e				++
h high rise z very high density ++ very good m middle high i high density + good l low e low density						

288 Office locations and characteristics^b

The relationship between the employment in offices and the floor space needed is variable. When the growth of employment in an office building is absorbed in the existing building, the average space per worker decreases. On the other hand, in case of moving to a larger office building (anticipating future growth of employment) the space per employee will be very high. The interests of the institute that made the prognosis may influence the prognosis of the need for office buildings. Building consultancy agencies are interested in an optimistic view: because they earn more when many buildings are built. On the other hand, real estate consultancy agencies are interested in a pessimistic view: in that case there is more need for their services. Local government stimulates offices in their municipality because offices offer workplaces without pollution, and because certain exploitation problems can be solved, because it is expected that office organisations can pay a high rent. Moreover it is possible to influence the modal split by establishing the offices near public transport stops.^a

As is the case for businesses in general, offices can also be located on a variety of types of locations. Alongside is an example of distinguished office locations is shown.

28.6 CONCLUDING REMARKS

Programme research can be related to several objects, themes and points of view. These determine which different research activities are relevant. It is recommended to be very critical with respect to the used information as inquiries, statistics and interviews. Uncertainties should not be neglected, but should be met by a flexible design. After execution it is desirable to monitor developments in order to be able to evaluate the programme. Programme research is a continuing activity.

a Guyt, P. (2000) *Kantoren in kort bestek*.

b Gemeente Rotterdam (1999) *Kantorenbeleid 1999-2003*.