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DEVELOPMENT OF A MANAGEMENT AND ALLOCATION
SYSTEM IN A MEDICAL FACULTY IN THE NETHERLANDS.

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1. Introduction.

In January 1976 a new Dutch university started officially in Maastricht: The State University of Limburg; part of it is a Medical Faculty (number 8 in The Netherlands) that received its first students already in September 1974.

September 1976 the third group of 50 students entered. In between a research program has been developed also and integration with the regional health-care system of Southern-Limburg is in progress. This new faculty in fact is an experiment within the whole of Dutch Universities and Medical Faculties. The structure of the Maastricht curriculum, the design of the research program and the explicit choice of integration with the region as to the health care tasks of the faculty are different; the organizational structure, based upon the principles of Matrix Management, and the competences of governing bodies are different from other Dutch Medical Faculties too (for this an adaptation of the Law by Parliament was necessary). This of course, has influence upon the system of resource allocation for educational, research- and health care tasks, as well as upon the structure of decision making and responsibilities.

2. Basic Philosophy and objectives.

2.1 Before starting, a so called Basic Philosophy has been developed for the University,

In this we can read that objectives of the University are for instance:

- advancing individual and collective welfare;
- avoiding professional development and specialization within narrow limits of faculties and disciplines and stimulating co-operation and allocation of tasks between them;
- intensifying co-operation with regional education facilities, especially higher vocational institutions;
- building up co-operation with foreign universities in the neighbourhood of Southern-Limburg (for instance: Aachen, Liège, Hasselt);
- developing and improving educational methods.

2.2 As to the Medical Faculty, explicit objectives have been set also; for instance:

- improving the structure and functioning of the health care system, the Faculty has to work in and with;
- paying special attention to training of general practitioners:
 - besides intimate knowledge of somatic aspects of medicine,
 - better education as to social and behavioural sciences also;
 - advancing teamwork of general practitioners and non-medical experts in primary care, developing health care centers and group practices, etc.;
- supporting the two objectives just mentioned by research and health-care activities of the Faculty as well.

In chapter 4, 5 and 6 we will go further into these objectives and the elaboration into programs and projects.

The very fact of setting objectives explicitly and using them as a frame of reference is characteristic of the Maastricht Medical Faculty.

3. The structure of management and organization.

3.1 The Medical Faculty is part of a university. The means, necessary for the programs of all Faculties, are supplied by the Ministry of Education and Sciences as a lump sum.

This is divided among the Faculties by the democratically elected University Council; this Council lays down in a Faculty-regulation the responsibilities of groups and organs within a Faculty as well. Within this general framework, a Faculty is rather autonomous as to the drawing up and executing of educational, research- and health care programs.

3.2 Within the Medical Faculty the management structure is as follows:

3.2.1 The democratically elected Faculty Council (12 members) is composed of members of scientific staff (50%), technical and clerical staff (25%) and students (25%).

The Faculty Council decides on:

- matters of strategic importance, long term policy and objectives of the Faculty;
- the structure and content of curriculum, research- and health care program;
- establishing capacity groups (3.4) and project groups (3.5);
- general rules of time-spending by members of the Faculty;
- checking the execution of its decisions.

3.2.2 A Faculty Board is elected by the Council and has 5 members (the Dean and two other members of the scientific staff, one from the technical and clerical staff and one student).

The Board is responsible for the every day course of things and the execution of the decisions of the Council.

The Dean is chairman of the Faculty Council and the Faculty Board.

3.2.3 Advisory committees are elected by the Council in order to prepare its decisions as to teaching, research and health care objectives and programs, and as to budgetting and planning. 4 Advisory
Committees

3.3 The structure of organization is derived from the objectives of University (2.1) and Faculty (2.2).

Renewal of teaching activities, bringing together people from several disciplines in order to contribute to the improvement of health care system and specific parts of it, just like the fact the Faculty itself has to be developed as well, make necessary:

- a flexible structure of organization, that can adapt itself to changes outside the Faculty (in the region of Southern Limburg, in the integration of Universities and higher vocational education) and inside the Faculty as well (because of a relatively fast growth and refining of originally broad concepts);
- a structure of organization that leads people to interdisciplinary co-operation;
- a structure of organization that provides insight into what people are doing, where corrections have to be made and who is responsible for what;
- a structure of organization that allows the carrying out of a great variety of activities in mutual cohesion and with limited numbers of man-power.

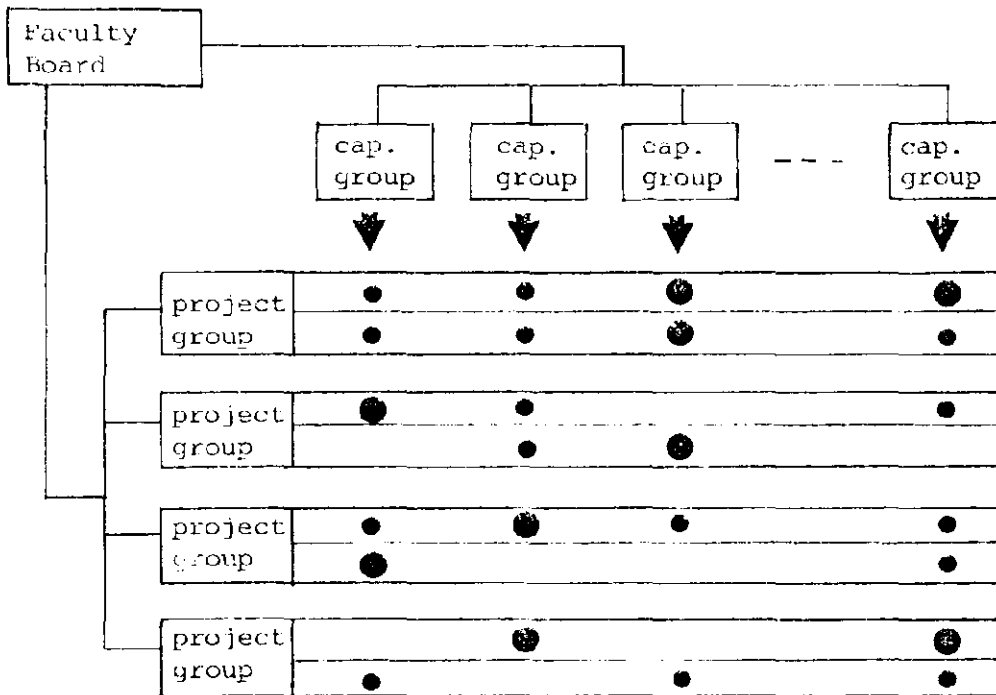
3.3.1 The Medical Faculty therefore chose the so called Matrix Organization, in which we can distinguish three main elements (see Figure 1):

- groups that are responsible for the availability and input of expertise of high quality; the so-called capacity groups (3.4);
- groups responsible for execution of a certain task by means of limited manpower and in good time; the so-called project groups (3.5);

(Nota bene: there is a fundamental difference as to the "traditional" faculty-department that performs the function of capacity group as well as of project group !)

- a group responsible for tuning in the available capacity (in capacity groups) to the need for capacity (in project groups) and for reporting back on the course of things; the Faculty Board (3.2.2).

Figure 1 : The structure of matrix organization



3.3.2 This kind of organization is flexible: a new task can be performed or an adjustment to external or internal changes can be made by addition or changing of a (rather small) project group.

Matrix organization forces to make explicit which disciplines (capacity groups) have to co-operate in a certain activity before hand and can change this number of disciplines rather easy; it distinguishes between people responsible for quality of know-how and knowledge, people responsible for execution of activities and projects and people responsible for co-ordination and reporting.

3.4 Capacity groups.

A capacity group is a number of members of the Faculty-population, cultivating the same part of science and/or working on the same field of application for the purpose of contributing to educational, research and health care projects from their collective knowledge and know-how.

*tem sub a sua dependencia os iniciais universis (p.14).
 Como "capacity group" tem um presidente (p.72/73)*

3.4.1 Capacity groups perform two main functions:

- the supply-function: providing expertise to Faculty-projects and therefore manning project-groups;
- the home base-function:
 - a permanent element of the organization and a place for identification with a discipline;
 - keeping the quality of expertise up to the mark and raising its standard, for instance by keeping in touch with developments of the concerning discipline;
 - allocation of tasks among the members of the group, taking into account a certain variety, an equable burdening during the year, satisfaction of labour and motivation.

Because departmental autonomy in most universities is very strong and a barrier to interdisciplinary co-operation, eliminating departments as organizational units contributes to one of the objectives of the university (2.1).

3.5 Project groups.

A project is a whole of activities aiming at a result that is part of the Faculty-policy and that is attained:

- within a fixed period of time;
- within the means that are placed to the groups disposal (budget or plan);
- in accordance with prearranged procedures and working-methods.
(for instance: problem-oriented; multidisciplinary; casting the parts).

A group of people engaged in the achievement of that kind of result is called: project group.

Cada "project" tiene un "manager" (p. 7, 14)

In chapter 4, 5 and 6 we will go further into educational, research- and health care projects.

3.6 Realizing programs of the Faculty.

We have seen by whom the course of action is prepared (3.2.3) and decided on (3.2.1).

Faculty Council

*Advisory
Committee*

As to each of three main programs of the Faculty (education, research, health care) within this framework a combined action of capacity groups and project groups has to be accomplished. The Faculty Board and the management of main projects perform this function. Problems as to efficient use of limited means have to be solved by them.

3.7 Evaluating programs of the Faculty.

- Project groups have to answer to management of main projects for activities and results in a certain period;
- management of main projects and (chairmen of) capacity groups have to answer to the Faculty Board;
- the Faculty Board makes an evaluation report from it and presents this to the Faculty Council.
- The advisory committees review this evaluation report and ask two main questions:
 - have decisions of the Faculty Council been effective ?
 - what can we learn from past experience when making plans for the future course of action ?

4. The Educational Program.

4.1 An elaboration of Faculty objectives has as a result the next characteristics of the 6 years Medical curriculum;

4.1.1 Emphasis on problem-orientation.

Students are confronted with problems from medical practise; solving these problems students are expected to use knowledge and know-how supported by different capacity groups.

Therefore instruction is not offered from the usual division into subjects as in a departmental structure.

The result is a better understanding of the connection of subjects and a clearer insight into the practical meaning of several elements of knowledge.

4.1.2 Self-activity.

The student has to play an active role in the curriculum.

Gathering information actively gives it a longer useful value; taking the initiative is a better reflection of practising the medical profession also.

4.1.3 Small group learning.

The size of groups is: 8 students. Co-operation in small groups is an important experience for future physicians for whom co-operation is growing important more and more.

This also enables a student to compare his efforts with performances of his colleagues.

Groups of students come together twice a week during two hours; for the rest of the week an appeal is made to the students self-activity.

4.1.4 Subdivision of a curriculum year in "blocks" and making explicit of block-objectives.

A block is the basic unit of the curriculum and can be considered as an -annually returning- project (3,5); it lasts for one or two months and refers to one theme or category of problems.

It prevents from cutting up a students attention to too many objects. It also necessitates a detailed preparation in a rather short period of time (concentration of staff time).

4.1.5 Study with the help of "block-books".

Problems to be solved during a "block" and indications for solutions and relevant information are brought together into a working-book. The writing down of this "block-book" facilitates the involvement of a lot of people in improving the curriculum and the guarding of its integrated character; it is prepared by a multidisciplinary composed "planning group".

Together with the high rate of self activity, the "block-book procedure" makes the need of manpower relatively independent from the number of students !

4.1.6 Continuous assesment.

Evaluation of results and progress is more spread over the year than is the case usually. The system of assesment facilitates the making of corrections by the students themselves as to their own performances as well as the improvement of a specific "block".

4.1.7 Training of skills.

Skills, necessary to practise medicine, are trained from the first year in a so called "skills-lab". Thus annoyance of patients is deminished; a laboratory-situation is more flexible than a situation in practical health care as well.

4.1.8 Making acquaintance with and participating in medical practise rather early in the curriculum.

Practical experience from the beginning and with growing intensity during the curriculum has a stimulating effect on students; it explains the meaning of problems in the "block-books".

4.2 The organization of the Educational Program is based upon the principles of matrix organization (3.3.1) in order to advance the co-operation of all disciplines (capacity groups) in those parts of the curriculum where their contribution is wanted.

4.2.1 All participants in the educational process have clearly circumscribed roles; thus all contributions from capacity-groups can be specified and people can be trained in performing one or more of those roles.

For instance: - co-ordinator of a "block",

- tutor of a small group,

- member of a planning-group that prepares a "block"

- co-ordinator of a curriculum-year, etc.

Standards have been set up as to the spending of time in performing several roles; an investigation into the time that is spend actually will correct those standards, if necessary.

4.2.2 The objectives and content of each curriculum-year and each "block" are worked out in detail.

A "block" can be seen as a project (3.5), a curriculum-year as a main-project.

- The first year is devoted to introduction and orientation into medicine: block 1.2, "Problem solving in groups", block 1.3, "Structure and functioning of health care", block 1.6, "Accidents" block 1.8, "Infections", etc.
- The second year is engaged in the functioning of the healthy man: block 2.2, "Growth and development", block 2.3 "Moving and working", block 2.4 "Growing older", etc.
- The third and fourth year starts with categories of complaints a general practitioner is confronted with: block 3.1 "Tiredness", block 3.3 "Vomitting", block 3.7 "Loss of blood", etc.
- The fifth and sixth year have not been completed yet.

4.2.3 The coming into being of the curriculum is facilitated by the explicit characteristics (4.1.1 - 4.1.8) of the curriculum, the distinguishing of roles (4.2.1) of participants and the writing down of objectives of the buildingstones of the curriculum: the blocks (4.2.2).
That is to say: the most important work is done beforehand, and the execution of the educational program and the drawing up of budgets and plans can be based upon it.

Figure 2 is a worked out matrix of block 1.5 "Arteriosclerosis"; in this block three "problems" are under discussion. The volume and diversity of contributions of several capacity groups is shown. The capacity groups are responsible for the quality of their contributions, the co-ordinator of this block and the members of his project-group ("planning group") are responsible for the integration of the several contributions into a "block book" and the optimum course of this one month of education. The Faculty Board and the co-ordinator of the first year help along the tuning in of capacity groups to the project group and guard the execution of this part of the curriculum.

Figure 2 : Example of a matrix of education: block 1.5,
Arteriosclerosis.

| | | Biochemistry | Pharmacology | Physiology | Economy of health care | Surgery | Internal Medicine | Med. Psychology | Morphology | Pathology | Skillslab | First aid | General Practise |
|-----------|--------------------------|--------------|--------------|------------|------------------------|---------|-------------------|-----------------|------------|-----------|-----------|-----------|------------------|
| BLOCK 1.5 | hearth infarct | ● | • | ● | • | • | • | ● | ● | ● | ● | ● | ● |
| | cerebrovascular accident | • | • | ● | • | • | • | • | • | ● | • | • | ● |
| | claudicatio intermittens | • | ○ | • | ○ | • | • | ○ | • | ● | ● | ○ | ● |

- Small contribution
- Large contribution
- no participation

5. The Research Program.

5.1 The matrix organization can prevent splintering of forces (as is the case in a departmental structure very often) and brings together the contributions of different capacity groups into a coherent whole of a restricted number of research themes.

Themes are derived from the objectives of University (2.1) and Faculty (2.2):

- Assesment of the effectiveness of health care systems in general (important to educational program also !),
investigation into primary care in particular;

- epidemiology of illness in the region of Southern Limburg;
- aging of the population;
- changes in patterns of life and social setting because of our fast evolving society.

5.2 Those themes are elaborated by the Advisory Committee on research into 10 multidisciplinary main-projects, subdivided into projects and so called "research-elements".

Research-elements are units of planning and reporting.

The organization of the Research Program is, mutatis mutandis, comparable with the organization of the Educational Program.

Some examples of main projects:

- Aging of immunologic apparatus;
- Originating of thrombosis and changes of vascular tissues;
- Structure and functioning of health care;
- Chronic patients and the influence upon the groups they live in;
- Medicine of sports, etc.

5.4 Research-elements and projects are put forward by the management of the concerning main-project; these proposals are judged by the Advisory Committee on research before the Faculty Council makes a decision.

This judgement is based upon the following criteria:

- projects have to be multidisciplinary in structure; research-elements can be mono-disciplinary. Integration of all capacity groups that can be considered has to be guaranteed;
- subjects must fit into the research themes of the Faculty (5.1);
- the question must be derived from health care problems;
- the scientific level has to be adequate;
- the result of the element/project should be attained within the set periode of time (reasonable chance).

6. The Health Care Program.

6.1 The curriculum and the research tasks urge the Faculty to participate as actively as possible in all parts of the health care system.

The emphasis is on co-operation with or taking over of existing facilities in the region: bringing together as an organization facilities that are geographically spread over the region and utilizing existing (clinical) resources rather than taking the position that everything must be created anew. This applies to the Academic Hospital as well.

6.2 A main objective of the Faculty is contributing directly to development and improvement of health care.

The next themes can be mentioned:

- patient care: - necessary because of the curriculum: clinical education and training need access to places where diagnosis and treatment occurs; contacts of students and patients are indispensable;
 - clinical know-how and skills of faculty staff have to be kept up to the mark;
 - research activities as to clinical questions need access to patients;
 - experiences in the health care system can stimulate activities that aim at improvement of effectiveness and efficiency of health care;
- creating, enlarging and change of health care facilities: health care facilities in the region can not satisfy all wishes from the Faculty;
- evaluation of medical treatment and existing health care facilities: on behalf of improvement of quality and as an instrument that can adjust existing working-methods
- experiments that can test the influence of measures mentioned above, before they are introduced.

6.3 The elaboration of these themes into (main-)projects is not finished yet, partly because health care projects are derived from and related to health care problems, that are determined by specific situations, have to be agreed upon in consultation with the region and are fluctuating.

The matrix organization can afford the flexibility to manage the co-operation of regional health care and Medical Faculty as to the Health Care Program.

7. Budgetting.

Drawing up a budget or a plan has to be a reflection and a translation into figures of the course of action to be pursued; it performs functions as to - allocation of resources;
- control of the execution of programs and projects.

The course of actions aims at gaining the desired results in accordance with the objectives; this is done by putting together the approved programs of activities and the available expertise (and means).

7.1 This asks for making two kinds of budgets:

7.1.1 a budget derived from the programs and activities to be executed: after a program of activities has been determined that has to lead towards the desired results, one has to decide what kind of contributions from different capacity groups are expected and how one will make use of available capacities (people and means).

This is the program-oriented earmarking budgetting;

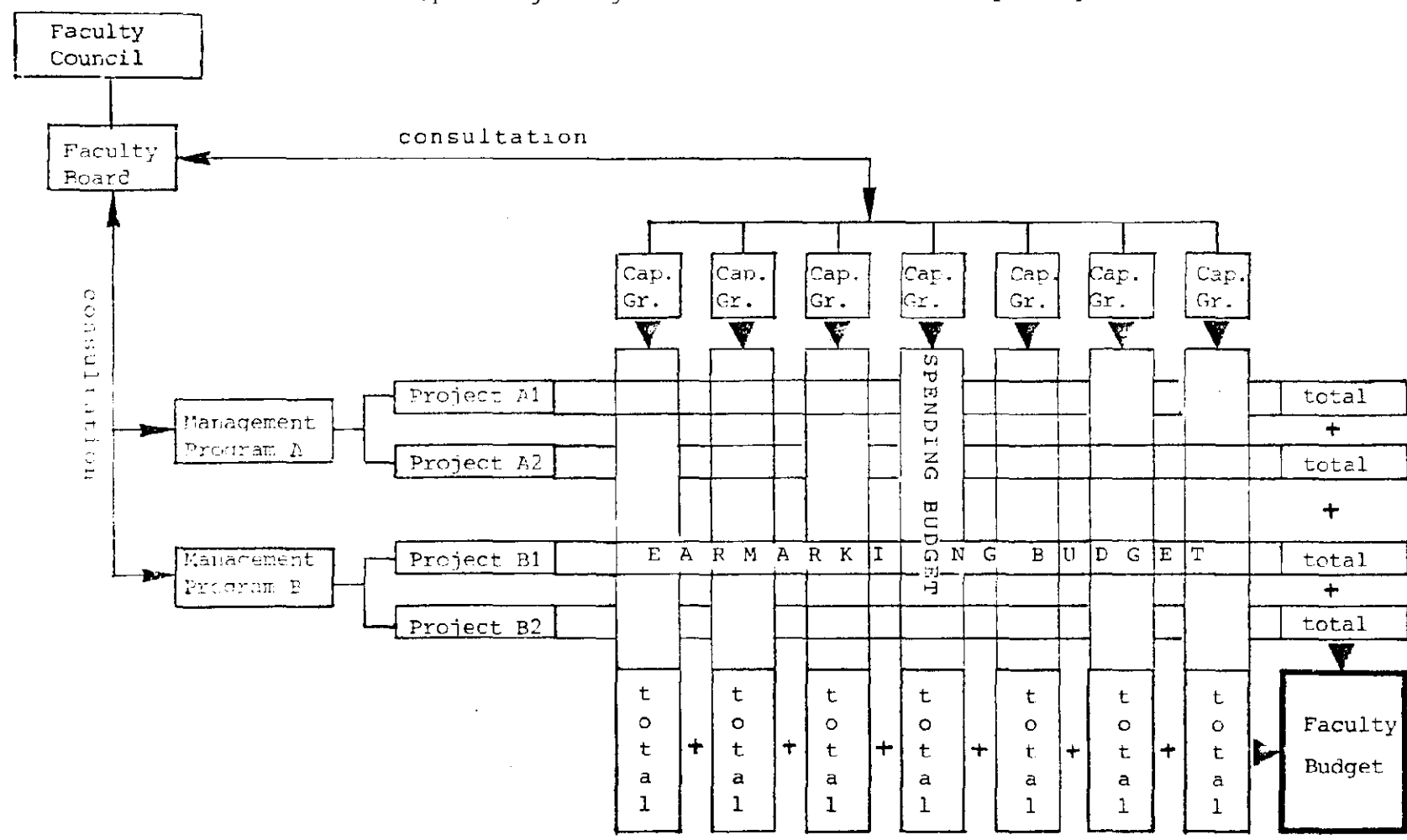
7.1.2 a budget as to the resources one needs to execute those programs; in this budget expression is given to how much capacity is needed to supply these contributions (7.1.1) and where this capacity is placed.

This capacity oriented budget is called: the spending budget.

The earmarking budget has to do also with questions about efficiency, effectiveness, and lowering the total need of means by bringing them into action flexibly; by the spending budget the diversity and amount of people and means which are put into capacity groups, are marked.

7.2 The allocation of resources to capacity-groups is, based upon the picture of the wanted future destination of these means, done in the light of the spending budget. This refers to personnel and big and expensive apparatus primarily.

Figure 3 : The integration of earmaking budgets and spending budgets into a total Faculty Budget



Bringing together of resources into project groups is based upon the earmarking budget.

7.3 The control of the extent to which the available capacity is used, can be done by comparing with the earmarking budget between times; the control of the development and maintenance of capacity in capacity-groups is done by comparing with the spending-budget.

7.4 The coming about of budgets, earmarking budget as well as spending budget, must be prepared in one period of time.

Capacity groups have to know what will be asked from them on the base of approved programs, before they can draw up their spending budget. The management of programs has to know the consequences of its wishes as to capacity from several capacity groups, before drawing up its earmarking budget.

The total budget of the Faculty (an integration of, all earmarking budgets and all spending budgets; see Figure 3) must be the result of consultation of capacity groups, management of programs and Faculty Board together; it is approved by the Faculty Council.

In a steady state situation this will be a case of introducing changes into the long-term plan.

In the phase of development we are in now, a lot of energy has to be spend on implementation of this system while Faculty programs are developed and executed at the same time,

8. Concluding remarks.

The Medical Faculty at Maastricht has chosen deliberately its structure of organization. The emphasis on co-operation of several disciplines in a situation of rapid growth, aiming at renewing of education, converging of research efforts and integration of health care activities into the regional health care system, has led to this choice.

Matrix organization at one side forces to distinguish tasks and responsibilities of its components very accurate; at the other side there is a necessity for a strong co-ordinating body that can keep in balance the "capacity-groups" and the "project-groups".

Project groups execute parts of the programs the Faculty Council has approved to; they integrate the contributions from different disciplines. The quality of those contributions has to be high and the most likely member of staff should perform a specific task: capacity groups take care of this.

The course of action and direction of development is decided on by the Faculty Council: this body determines what shall be done in the field of education, research and health care (a decision that is made within departments elsewhere, especially as to research). The Faculty Board co-ordinates the accomplishing of those tasks by the two categories of groups just mentioned and has to keep in contact with managers of projects as well as chairmen of capacity groups very closely. Here we touch on a vital function within the matrix organization !

Besides distinguishing functions and roles, matrix organization also forces to elaborate programs in detail; otherwise it would be impossible to formulate what contributions from which capacity groups are wanted or to form project groups. Making explicit what activities will be executed and by whom contributions will be made is very helpful to the drawing up of budgets and allocation of personnel and means.

This also allows for the use of budgets as steering mechanism and as help for evaluation and guarding of programs,

So there is a clear cohesion of the structure of organization and the system of budgetting and planning.

The growth from 150 students in 1976 to about 900 students in 1986, the growing of man-power from 175 in 1976 to about 600 in 1986, doubling the number of about 15 capacity groups in this period of time and a large expansion of project groups, will enable the Faculty to explore the possibilities of the chosen structure thoroughly.

External developments at a national level (integration of University and Higher Vocational Education, changes in the Health Care System) and a regional level (coming into being of a co-operating organization of all medical facilities and echelons in the region of Southern Limburg:

the so called Medical Regional Center), will offer opportunities to examine the flexibility of the structure in joining those developments.

This refers to international co-operation also (Aachen and Liège at a distance of less than 30 km from Maastricht).

Writing this paper, a number of internal notes is made use of, as well as of an internal report by Prof. A.A. Kampfraath, Agricultural University, Wageningen, titled: "Matrix management in de Universiteit, 2e Concept" (Matrix management in the University, 2nd Draft), 1975.