

THE ROLE OF THE WOMEN IN BUSINESS MANAGEMENT

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ABSTRACT

The main purpose of this work is to study the rôle of the women in different levels of business management. The system under study is composed of:

- business sector, in which women carry out their activities
- educational subsystem, which provides them with the necessary skills to ascend to different managerial positions
- cultural and socioeconomic conditions of the country, which influence :
 - . the motivation of women for this kind of work
 - . the entrepreneurial attitude to hiring females in firms

The characteristics of the system together with the pursued objective bring us to the choice of System Dynamics as the most adequate method for our study. Using as our starting point a causal diagram of the global system, we have divided it in sectors. These represent the different aspects above mentioned.

This is a long-term project from which we hope to obtain partial results to be presented in the 1986 System Dynamics Conference.

"Women are becoming more conscious of their rights. Society as a whole has begun to respond... The attitudes of mind of women as well as men must change Both are partners in life's struggle."

Indira Ghandi, 1984

1.- PRESENTATION AND RESEARCH OBJECTIVES.-

The problem of participation of women in the working world and especially in posts of responsibility acquires international recognition when the U.N. declares the period 1975-1985 as the "Decade for Women". From this moment onwards, national and international organisms and societies become more and more concerned about the participation of women.

In 1985, the authors of this paper gave a course about System Dynamics in the U.N.C.P. of Buenos Aires (Argentina). During this course, a group of investigators studying the rôle of the woman in management posts in Industry in Argentina suggested that we should collaborate in the methodological aspects by elaborating a System Dynamics model.

Since then we have been working separately in Argentina and Spain with the logical difficulties in communication. The Argentine group, composed of psychologists and sociologists, was created in Buenos Aires during a Meeting about this subject, sponsored by the Boston Bank Foundation and the U.N. Organisation for Industrial Development.

The following objectives were established under common agreement:

- 1.- To study both the current situation and the evolution of the rôle of women in the working world, with special emphasis on management posts where the lack of balance is more accentuated.
- 2.- To examine the causes underlying women's participation and its evolution in time.
- 3.- To create a simulation model of the reality under study, specifically of business and educational sectors, which are closely linked. Likewise aspects of background influencing the main variables (e.g: "social culture", "entrepreneurial culture", etc.) should be considered.

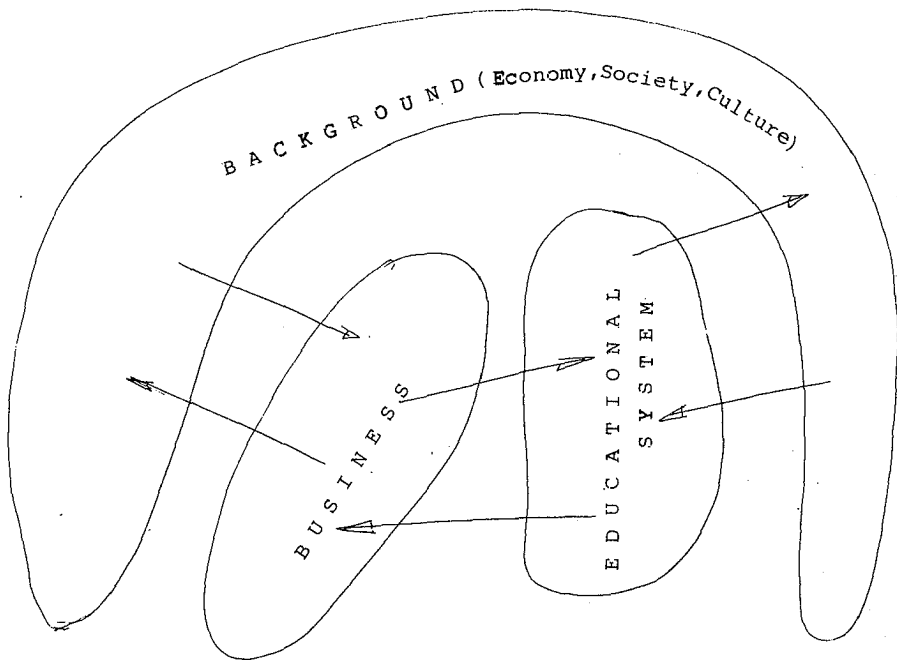


FIGURE 1 .- Scheme of the System Under Study

- 4.- To forecast the future evolution of women's participation in the different business posts under various hypotheses:
 - continuation of the present conditions
 - establishment of alternative conditions different from the present ones.
- 5.- To explore the various actions and policies which could modify the system behaviour in the desired way.

Unfortunately there emerged increasing difficulty in communication bringing the research to a standstill. At this very moment the state of things is reflected in the following sections.

2.- THE SYSTEM UNDER STUDY.-

According to the established objectives and to the peculiar characteristics of the system under study, we consider it opportune to divide it into three basic sectors:

- business
- educational system
- economic, social and cultural backgrounds which are interrelated as can be observed in figure 1, which we shall comment briefly.

There exists a strong influence of the economic background on employment in the business world, as far as quantity and professional category are concerned. This is true independently of the sex of the people who will get such jobs. As the main purpose of our research consists in the specific study of the rôle of women, it is necessary to consider another series of factors and relationships which have a considerable influence on the recruitment and promotion of personnel because of the sexual differentiation. Among them we can mention principally:

- the educational system

It is obvious that the greater or lesser number of female candidates for different jobs will depend on various factors, for example:

- . the proportion men/women at the different stages in the Educational System
- . the kind of studies followed by each sex (careers supposedly masculine (e.g. engineering) and careers supposedly feminine (e.g. art subjects))

The mentioned factors will be conditioned by social and cultural characteristics, which we shall comment on later.

- social and cultural background

It is evident that the cultural patterns of a society influence:

- . the predisposition of the firm to hire preferably men for posts which could be carried out indistinctly by men and women
- . women's job perspectives, which can induce them to choose studies with few possibilities in the business world

However these cultural patterns are changing, even though the process is slow, because:

- . firms are employing more and more women
- . women are studying more careers with business possibilities

To facilitate the model building, every mentioned sector will be considered as an interrelated subsystem, although, at the present stage, the background subsystem will have a strong exogenous character. On the other hand, and for the above mentioned reasons, men and women will be treated in a disaggregated manner.

3.- CAUSAL AGGREGATED DIAGRAM OF THE SYSTEM.-

Before the presentation of the causal diagram of the system under study, we consider it necessary to describe more precisely the main aspects of the two principal subsystems.

3.1.- Business subsystem.

The analysis of the business subsystem will be carried out under the hypothesis that professional promotion is based on four fundamental stages:

- operation
- supervision
- management
- top management

In addition to other general economic factors (e.g. aggregated demand, G.N.P., etc.), the needs of personnel at every mentioned stage will depend on the economic sector where the firm effects its activity and its degree of technological development.

In given circumstances and as a first approach, it is possible to admit the hypothesis that there is a specific relationship between the number of posts existing at the different stages. For a specific economic sector, this helps us to calculate the gross needs of

personnel for the above mentioned stages. If we also take into account the occupied posts, we can calculate the net supply of the former ones.

If the economic conjuncture allows it, this supply will induce the recruitment or the dismissal of the corresponding personnel.

We have taken for granted that there are two distinct--ways to fill the vacancies at each stage in the firm (except for the operation stage):

- internal promotion from the immediately inferior scale (with or without additional training, according to the case)
- external recruitment of :
 - . people who have received an adequate formation in the educational system but without previous job experience
 - . unemployed people with previous job experience

Within this basic scheme, and fundamentally for cultural reasons (entrepreneurial culture), we have to consider the apparition of a discrimination in the choice of men or women to fill a vacancy. As we said before, it leads to an unbalance in the proportion men/women in the enterprise stages. This becomes more and more evident the higher the position in the firm.

Owing to sociocultural reasons, the above factor is strengthened because there is a lesser number of women candidates to fill the vacancies.

Summing up, there are fewer women than men in internal promotion as in external recruitment.

3.2.- Educational subsystem.

The analysis of the educational subsystem is carried out under the hypothesis that its structure is composed of three different stages:

- primary studies
- secondary studies
- university studies

In general terms, the inputs for each stage come:

- directly from the immediately lower stages (except for the beginning of primary studies)
- from people who left the system voluntarily (for personal reasons or because they were rejected)

As for the outputs, they are generated by:

- entrance into the following higher stage
- "rejection" by the system (people do not adequately fulfill the requirements for permanence)
- people who leave voluntarily the system for "personal" reasons

These inputs and outputs represent the progression through the different stages of the system. This process is influenced by several factors, among them we can mention the following ones:

- the economic situation of the country (its wealth and its distribution)
- the easy access to studies, which is related to the above factor and to the distance between schools and potential students
- the situation of the "job" market: the bigger the supply of posts the more people tend to leave the educational subsystem or try to make work and study compatible

In addition, as regards the situation of women, their progression through the educational subsystem depends on:

- the percentage of women at every stage
- sociocultural factors such as :
 - . women's perception of business work possibilities in different categories
 - . current amount of posts supplied for women, which is less than appears because the business culture

As occurs in the business subsystem, the lack of balance between the men/women proportion at every stage can be corrected by the evolution of factors that influence the social and entrepreneurial culture.

3.3.- Background.

In the previous subsections, we commented on the background when we referred to the influence of the economic and sociocultural factors.

We could add that:

- in relation to the social culture:
 - . the ideal one would not discriminate women from men
 - . as the existing social culture approaches the ideal one, the proportion men/women tends to maintain its value through the different stages

- . the discrepancy between the existing and the ideal social culture discriminates only women. They diminish its relative importance for the higher stages in the hierarchical structure
- in relation to the entrepreneurial culture we find :
 - . analogous characteristics to the above mentioned ones
 - . the influence of the motives which probably lead women to abandon the business world (marriage, maternity, children education, etc.). At the same time, these motives are influenced by the existing social culture.

3.4.- Causal diagram.

The majority of the previous considerations are summed up in the causal diagram in figure 2. In order to simplify this diagram, we have not considered every mentioned factor in an explicit way (e.g. disaggregation of men and women). They will be observed in greater detail in the corresponding dynamo diagrams (see section 4).

Although briefly, it would be appropriate to underline the main relationships between the educational and the business subsystems:

- the vacancies at the operation stage will be filled principally by:
 - . people who have finished their primary studies
 - . people who have not completed their secondary studies for various reasons
 - . people who have concluded secondary studies and who would accept and operative post if they were not to find a superior one
- for the other stages a similar sort of scheme is reproduced (see figure 2).

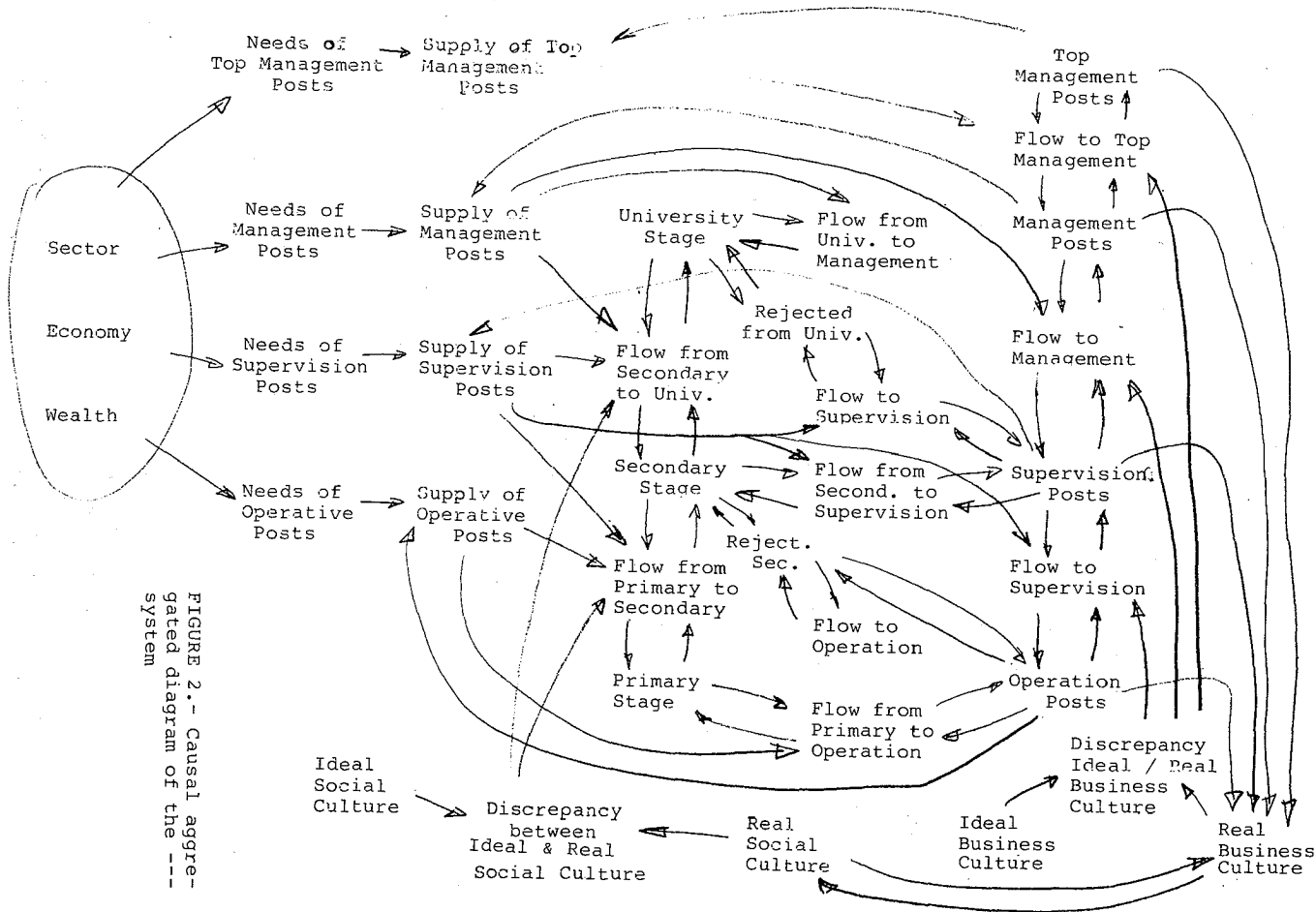


FIGURE 2.- Causal aggregated diagram of the system

4.- MODEL FORMALISATION.-

In the process of model formalisation we shall maintain the same working scheme, diferentiating the business and the educational subsystems. Background factors will be directly included in the above mentioned subsystems.

4.1.- Business subsystem.

The state variables coincide basically with the stages mentioned in subsection 3.1 :

- operation posts
- supervision posts
- management posts
- top management posts

For greater accuracy it is convenient to consider in each of them:

- occupied posts
- candidates to cover the net supply

Moreover, due to the objectives of this research, it is necessary to make the disaggregation men/women.

According to the above considerations the following level variables appear for each stage:

- level of posts occupied by men
- level of posts occupied by women
- level of men candidates
- level of women candidates

The treatment of the stages is quite similar except for top management which has peculiar characteristics which we shall not discuss here for greater brevity. For the same reason we shall only discuss the levels related to women at the operation stage (levels related to men are treated identically).

LWCOP

Level of women candidates for operation posts

As we can see in figure 3, the evolution of this level is regulated for the following inputs and outputs:

- 1- Inputs: In this case, they are produced only by external recruitment (see subsections 3.1 and 3.4), and concretely by:
 - a- unemployed women with previous job experience (normally dismissed from the operation stage)
 - b- unemployed women without previous job experience who have received an adequate formation.

Normally they are:

- * women with finished primary studies who left the educational subsystem
- # women who have not completed their secondary studies for various reasons
- & women with finished secondary studies and who would accept an operative post

According to 1-a- and 1-b- we have created three rate variables:

- RWDOP-- Rate of women dismissed from operative posts (from 1-a-)
- RWFPUS-- Rate of women with finished primary studies or with unfinished secondary ones (from 1-b-(* and #))
- RWFSO-- Rate of women with finished secondary studies who are candidates for operative posts (from 1-b-(&))

-2- Outputs: They are only produced by the recruitment of women for the operative stage. This leads to the following rate :

- RWHOP-- Rate of women hired for operation posts

Therefore, the corresponding equation for the level LWCOP should be :

$$L \quad LWCOP.K = LWCOP.J + DT*(RWDOP.JK + RWFPUS.JK + RWFSO.JK - RWHOP.JK)$$

LOPOW
Level of operation posts occupied by women

This level (see figure 4) has just one input and one output, which represent, respectively :

- the rate of women hired to fill operation vacancies (RWHOV)
- the rate of women dismissed from operation posts (RWDOP)

Thus the equation for the level LOPOW should be:

$$L \quad LOPOW.K = LOPOW.J + DT*(RWHOV.JK - RWDOP.JK)$$

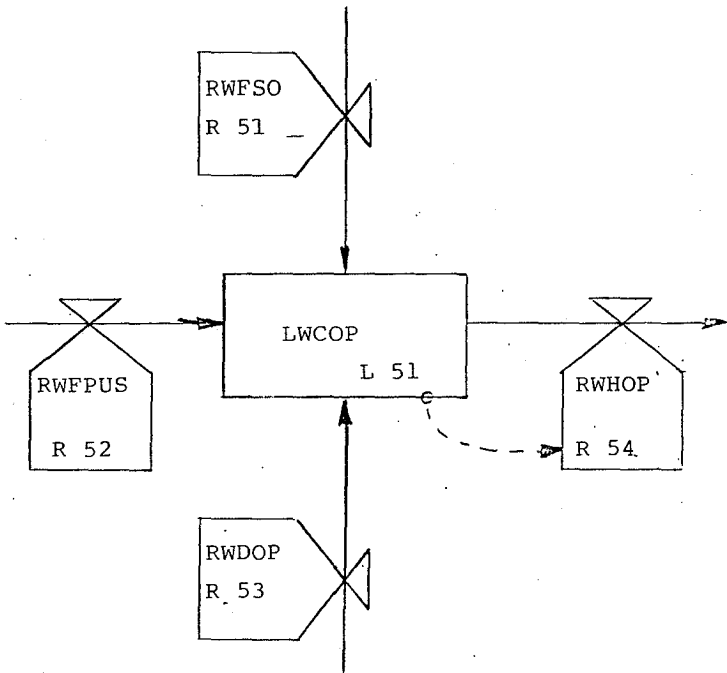


FIGURE 3 .- Level of women candidates for operation posts

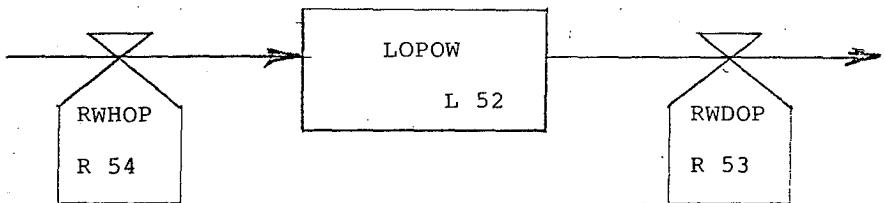


FIGURE 4 .- Level of operation posts occupied by women

As an example of rate and auxiliary variables we can mention :

RWFSO
Rate of women with finished secondary studies who
are candidates for operation posts

This rate is one of the inputs of the level LWCOP previously discussed. It is equal to the variation in the quantity of unemployed women with the mentioned formation, represented by the auxiliary variable VQUWFS. This leads to :

$$R \quad RWFSO.KL = VQUWFS.K$$

UWFS
Unemployed women with finished secondary studies

This auxiliary variable, which has indirect influence upon the one previously described (RWFSO), measures the difference between the total amount of women with finished secondary studies who left the educational subsystem (WFSLE) and the operation posts covered by women of the mentioned characteristics (OPCWS). Thus :

$$A \quad UWFS.K = WFSLE.K - OPCWS.K$$

Figure 5 shows the dynamo diagram corresponding to the operation stage of the business subsystem, where we can see, among others, the discussed variables. In annexe a list of the corresponding variables is presented.

4.2.- Educational subsystem.

As for subsection 4.1, the state variables correspond basically to the stages of the educational subsystem (see 3.2) :

- primary studies
- secondary studies
- university studies

In this piece of research we are interested in the educational subsystem because of its relationship with the business subsystem. Thus, it is necessary to analyze the former in relation to the latter; in general terms, this leads to the following possible situations for people at each stage:

- people currently studying. In some cases they can make their studies compatible with a job.
- people with finished studies who left the educational subsystem. They can:

- . stay out of it and be unemployed
- . rejoin the educational subsystem at a superior stage after some time
- . get a job in the working market
- people rejected from the educational subsystem. They can:
 - . stay out of it and be unemployed
 - . rejoin the educational subsystem at the same stage after some time
 - . get a job in the working market (if they have the necessary qualifications)

According to the above comments we can find, at every stage, the following level variables:

- level of people currently studying
- level of people with finished studies who left the educational subsystem
- level of rejected people

We shall treat the three stages in a similar manner except for the normal progression through the subsystem, where we find that:

- the level of people currently studying at the primary stage does not receive any input from a lower level
- the level of people with finished university studies does not send any output towards a higher level

To avoid an excessive reiteration we shall only discuss the secondary stage in some detail.

LCSS

Level of people currently studying at the secondary stage

This level evolves by the action of the following inputs and outputs (see figure 6):

- 1- Inputs, which have three origins :
 - a- the natural progression from the level of people with finished primary studies that continue in the subsystem
 - b- the level of people with finished primary studies who left the educational subsystem and rejoin it after some time
 - c- the level of people rejected from primary studies who decide to study again re-entering at the same stage
- 2- Outputs, towards three different destinations:
 - a- the level of people currently studying at the University stage

- b- the level of people with finished secondary studies who left the educational subsystem
- c- the level of people rejected from secondary studies

Logically, that brings us to the following equation for the level under study, LCSS :

$$L \quad LCSS.K = LCSS.J + DT*(FPS.JK+FPLEJS.JK+RSR.JK-FSU.JK-FFSLE.JK-FRS.JK)$$

where :

- FPS = Flow from primary studies to the secondary stage (see 1-a-)
- FPLEJS = Flow of people with finished primary studies who left the educational subsystem and join secondary studies (see 1-b-)
- FRSR = Flow of people rejected from secondary studies who rejoin this stage (see 1-c-)
- FSU = Flow from secondary studies to the university stage (see 2-a-)
- FFSLE = Flow of people with finished secondary studies who leave the educational subsystem (see 2-b-)
- FRS = Flow of people rejected from secondary studies (see 2-c-)

LRS

Level of people rejected from secondary studies

As we can see in figure 7, this level receives one input from the level of people currently studying at the secondary stage, which coincides with the rate FRS above mentioned.

With regards to the outputs, there are two, which represent respectively :

- the flow of people that rejoin the educational subsystem at the secondary stage, which was named FRSR
- the people who get an adequate job; this leads to the apparition of a new flow variable, FRSGJ

The corresponding equation should be :

$$L \quad LRS.K = LRS.J + DT*(FRS.JK-FRSR.JK-FRSGJ.JK)$$

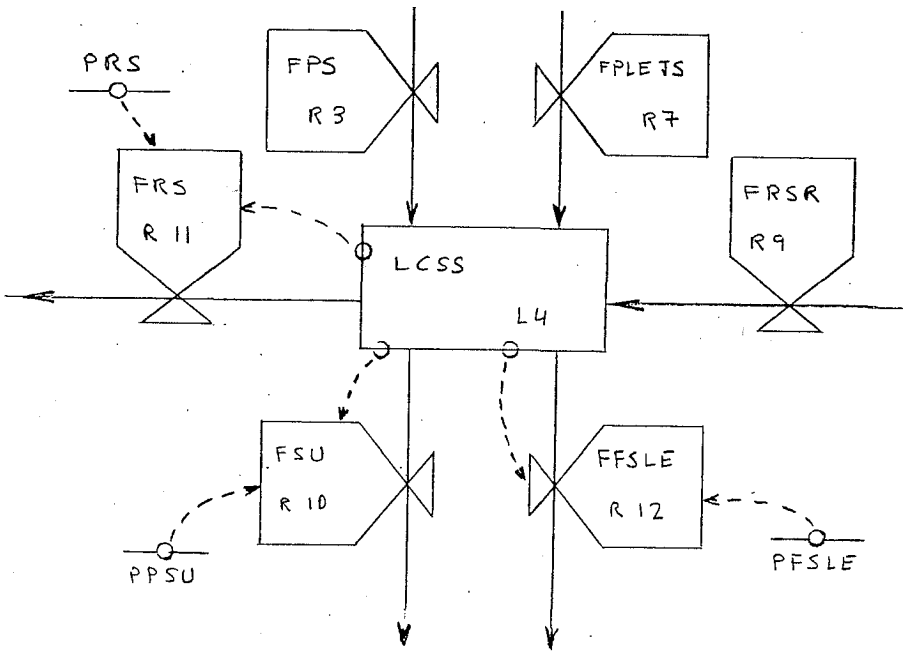


FIGURE 6.- Level of people currently studying secondary studies

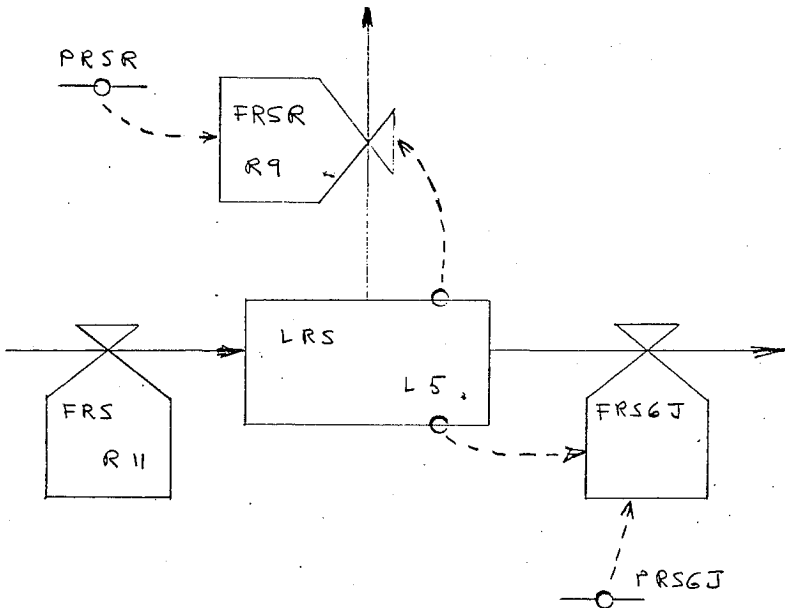


FIGURE 7.- Level of people rejected from secondary studies

LFSLE
Level of people with finished secondary studies
who left the educational subsystem

The inputs and outputs governing this level are (see figure 8) :

- Input of people who finish secondary studies and do not reach the university stage. This input coincides with the rate FFSLE previously mentioned
- output towards the university level, represented by the rate FSLEJU (Flow of people with finished secondary studies who left the educational subsystem and join the university stage)
- output towards the working world, which we shall name FFSGJ (Flow of people with finished secondary studies who get a job)

Therefore, the equation of LFSLE can be written as :

$$L \quad LFSLE.K = LFSLE.J + DT*(FFSLE.JK - FSLEJU.JK - FFSGJ.JK)$$

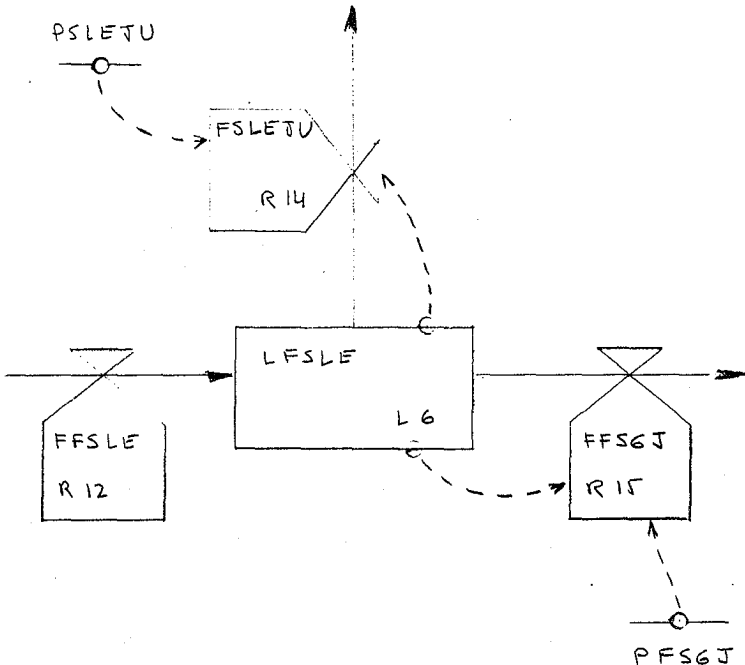


FIGURE 8.- Level of people with finished secondary studies who left the educational subsystem

As an example of rate variable we can write the equation of FSU (flow from secondary studies to the university stage), which appeared when we discussed the level LCSS. FSU can be defined simply as :

$$R \quad \text{FSU.KL} = \text{LCSS.K} * \text{PSPSU.K}$$

where

LCSS = Level of people currently studying at the
 PSPSU = ^{secondary stage}Percentage of students passing from secondary studies to the university stage (defined exogenously

Figure 9 shows the dynamo diagram of this first version of the educational subsystem, where we can see, among others, the mentioned variables. In the annexe we have enclosed a list of the corresponding variables)

5.- FINAL REMARKS.-

We are conscious of the gap existing in this version of our research, principally due to the difficulties mentioned in section 1, which we hope to solve soon. In brief, the next steps to be taken in the process of our research will be:

- to develop more accurately the educational subsystem (but without losing sight of our objectives)
- to study in depth the interactions between the educational and the business subsystems
- to treat the background more accurately
- at the same time, to prepare a more accurate version of the model. In this way, it will be possible to do computer simulations which will help improve the model

Before writing this paper we asked ourselves whether it was appropriate or not to present an unfinished piece of work at a Conference such as this. Our answer was affirmative for the following reasons :

- the possibility to debate the current research before a qualified public. This fact will undoubtedly enrich and benefit its future development
- the elaboration of a sufficiently elaborated written document helps us to organize our ideas better, to analyze the adopted objectives more accurately, etc. In short, it helps us adopt a better approach to the work still to be done.

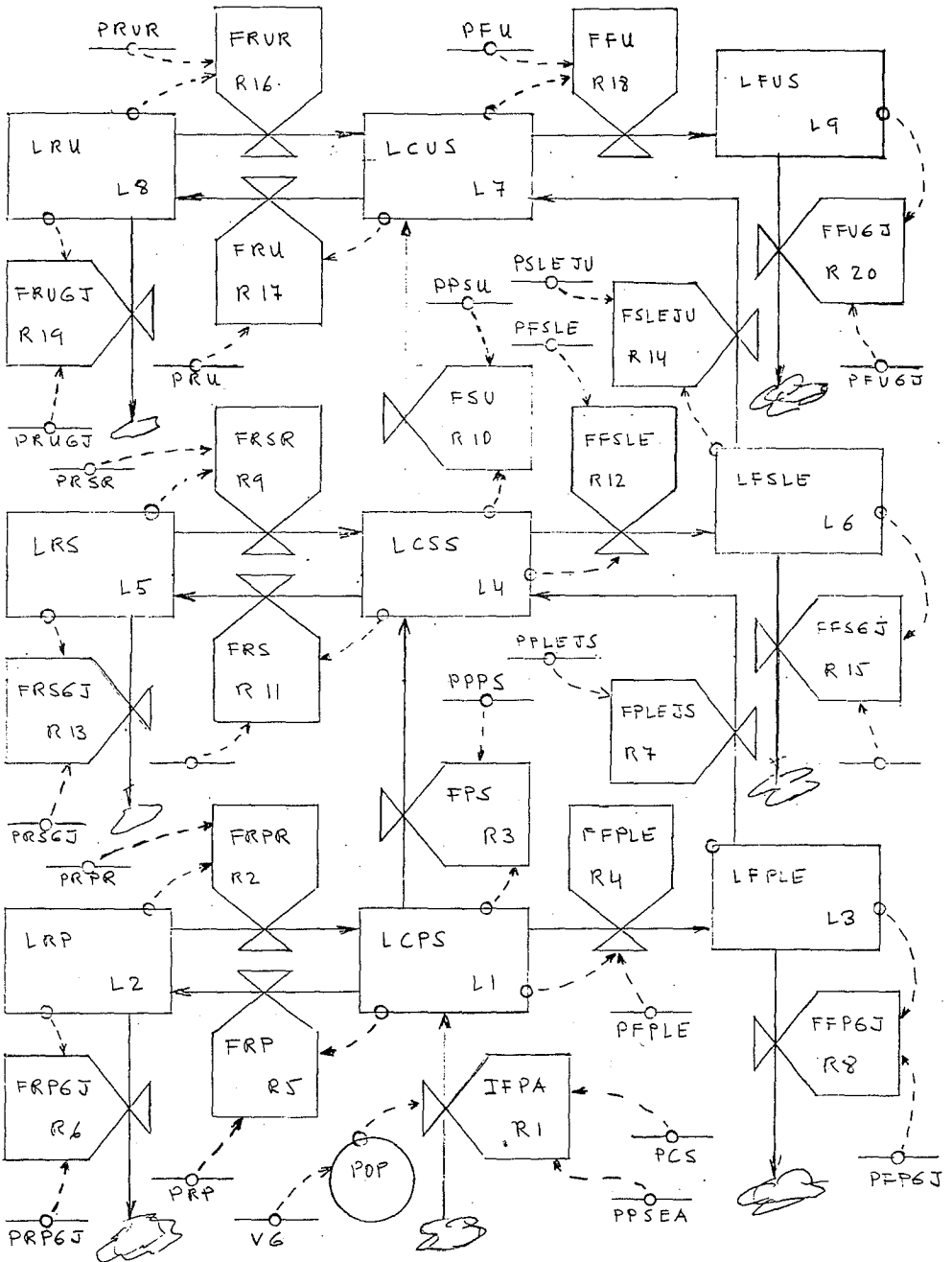


FIGURE 9.- First version of the educational subsystem

ANNEXE : LIST OF VARIABLES

OPERATION STAGE OF THE BUSINESS SUBSYSTEM (see the corresponding Dynamo diagram in figure 5)

LEVELS

LWCOP Level of women candidates for operation posts
 LOPOW Level of operation posts occupied by women
 LMCOP Level of men candidates for operation posts
 LOPOM Level of operation posts occupied by men

RATES

RWFSO Rate of women with finished secondary studies who --
 are candidates for operative posts
 RWFPUS Rate of women with finished primary studies or with
 unfinished secondary studies
 RWDOP Rate of women dismissed from operative posts
 RWHOP Rate of women hired for operative posts
 RMFSO Rate of men with finished secondary studies who are
 candidates for operative posts
 RMFPUS Rate of men with finished primary studies or with un-
 finished secondary studies
 RMDOP Rate of men dismissed from operation posts
 RMHOP Rate of men hired for operation posts

AUXILIARIES

WFSLE Women with finished secondary studies who left the -
 educational subsystem
 OPCWS Operation posts covered by women with finished secon-
 dary studies
 UWFS Unemployed women with finished secondary studies
 VQUWFS Variation in the quantity of unemployed women with -
 finished secondary studies who are candidates for -
 operation posts
 WFPLE Women with finished primary studies who left the edu-
 cational subsystem
 WCSS Women currently studying at the secondary stage
 WRS Women rejected from secondary studies
 OPCWP Operation posts covered by women with finished pri--
 mary studies
 UWFPUS Unemployed women with finished primary studies or --
 with unfinished secondary studies
 VUWPUS Variation in the quantity of unemployed women with -
 finished primary studies or unfinished secondary ones
 CPWOP Current percentage of women in operative posts
 POPFW Percentage of operative vacancies to be filled by wo-
 men
 SOPW Supply of operative posts for women
 SOPM Supply of operative posts for men
 OPCMS Operation posts covered by men with finished seconda-
 ry studies
 MFSLE Men with finished secondary studies who left the edu-

	educational subsystem
UMFS	Unemployed men with finished secondary studies
VQUMFS	Variation in the quantity of unemployed men with finished secondary studies
MFPLE	Men with finished primary studies who left the educational subsystem
MCSS	Men currently studying at the secondary stage
WRS	Men rejected from secondary studies
OPCMP	Operative posts covered by men with finished primary studies
UMFPUS	Unemployed men with finished primary studies or with unfinished secondary studies
VUMPUS	Variation in the quantity of unemployed men with finished primary studies or unfinished secondary ones
PVUWFS	Previous value of the amount of unemployed women with finished secondary studies
PUWPUS	Previous value of the amount of unemployed women with finished primary studies or unfinished secondary ones
PVUMFS	Previous value of the amount of unemployed men with finished secondary studies
PUMPUS	Previous value of unemployed men with finished primary studies or unfinished secondary studies

CONSTANTS

PWFSLE	Percentage of women with finished secondary studies who left the educational subsystem
PWFPLE	Percentage of women with finished primary studies -- who left the educational subsystem
PWCSS	Percentage of women currently studying secondary studies
PWRS	Percentage of women rejected from the secondary stage
PMFSLE	Percentage of men with finished secondary studies -- who left the educational subsystem
PMFPLE	Percentage of men with finished primary studies who left the educational subsystem
PMCSS	Percentage of men currently studying secondary studies
PMRS	Percentage of men rejected from secondary studies

EXOGENOUS VARIABLES

POPOWS	Percentage of operative posts occupied by women with finished secondary studies
POPOWP	Percentage of operative posts occupied by women with finished primary studies
GNOP	Gross needs of operative posts
PACPOW	Period of adjustment for culture in the percentage of operation posts occupied by women
CPWOP	Cultural percentage of women in operative posts
POPOMS	Percentage of operative posts occupied by men with finished secondary studies
POPOMP	Percentage of operative posts occupied by men with finished primary studies

EDUCATIONAL SUBSYSTEM

(see the corresponding Dynamo diagram in figure 8)

LEVELS

LCSP Level of people currently studying at the primary stage

LFPLE Level of people with finished primary studies who -- left the educational subsystem

LRP Level of people rejected from primary studies

LCSS Level of people currently studying at the secondary stage

LRS Level of people rejected from secondary studies

LFSLE Level of people with finished secondary studies who left the educational subsystem

LCSU Level of people currently studying at University

LFUS Level of people with finished university studies

LRU Level of people rejected from the university stage

RATES

IFPA Input rate to the primary stage because of age

FFPLE Flow of people with finished primary studies who left the educational subsystem

FRP Flow of people rejected from primary studies

FPS Flow from primary studies to the secondary stage

FRPR Flow of rejected people from primary studies who re-join this stage

FFLEJS Flow of people with finished primary studies who left the educational subsystem and join secondary studies

FRS Flow of people rejected from secondary studies

FRSR Flow of people rejected from secondary studies who rejoin this stage

FSU Flow from secondary studies to the university stage

FFSLE Flow of people with finished secondary studies who left the educational subsystem

FSLEJU Flow of people with finished secondary studies who - left the educational subsystem and join the university stage

FRU Flow of people rejected from the university stage

FRUR Flow of people rejected from University who re-join this stage

FFU Flow of people with finished university studies

FFPGJ Flow of people with finished primary studies who get a job

FRPGJ Flow of people rejected from primary studies who get a job

FFSGJ Flow of people with finished secondary studies who - get a job

FRSGJ Flow of people rejected from secondary studies who - get a job

FFUGJ Flow of people with finished university studies who get a job

FRUGJ Flow of people rejected from university studies who get a job

AUXILIARIES

POP Population

CONSTANTS

PFFGJ Percentage of people with finished primary studies -
 who get a job
 PRPGJ Percentage of people rejected from primary studies -
 who get a job
 PFSGJ Percentage of people with finished secondary studies
 who get a job
 PRSGJ Percentage of people rejected from secondary studies
 who get a job
 PFUGJ Percentage of people with finished university studies
 who get a job
 PRUGJ Percentage of people rejected from university --
 studies who get a job
 PCS Percentage of current scholarship
 PPSEA Percentage of population with school entrance age
 PPFLE Percentage of people with finished primary studies -
 who leave the educational subsystem
 PRP Percentage of people rejected from primary studies
 PPPS Percentage of people passing from primary studies to
 secondary studies
 PRPR Percentage of people rejected from primary studies -
 who rejoin this stage
 PPLEJS Percentage of people with finished primary studies
 who left the educational subsystem and join the se-
 condary stage
 PRS Percentage of people rejected from secondary studies
 PRSR Percentage of people rejected from secondary studies
 who rejoin this stage
 PPSU Percentage of people passing from secondary studies
 to the university stage
 PFSLE Percentage of people with finished secondary studies
 who leave the educational subsystem
 PSLEJU Percentage of people with finished secondary studies
 who left the educational subsystem and join universi-
 ty studies
 PRU Percentage of people rejected from the university --
 stage
 PRUR Percentage of people rejected from university studies
 who rejoin this stage
 PFU Percentage of people with finished university studies