PLANNING MODEL FOR CONTINUOUS IMPROVEMENT OF THE COMMUNICATION SYSTEM IN MEXICO

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ABSTRACT

Communication systems are used to send information from one place to another through different media: the space, optical fiber, metallic wiring, etc. The most common systems are television, radio, infrared, satellite, telephone, and voice on IP, just to name a few. The general idea is to continuously improve the way of transmission, in order to assure that the addressee gets the information generated by the source in a fast, cheap, safe and truthful way. The model used in this article consists of five stages: first is the Reference Projection, in which a problem in the system is detected, using the techniques of Kawakita Jiro (TKJ), analytical hierarchal structuring and the principle of Pareto; in the normative planning the mission of the system is established; in the strategic planning a solution for the detected problems is proposed; the organizational planning describes the resources needed for the problematic case to be solved; and the fifth stage is an evaluation about the feasibility of the solution.

STRUCTURE OF THE PLANNING MODEL OF HAZAN OZBECKHAN[1]

Problematic Situation

Establishing the problem constitutes an important aid in order to see clearly the focal object, this one defined as the system we are interested in; that is, the part over which control can be exerted by the staff on charge of planning. Within the first stage problems are classified by groups, using the Kawakita-Jiro technique (TKJ), the model of decisions of the Analytical Hierarchal structuring, the principle of Pareto, and the Ishikawa technique (Figure 1).

Projection of Tendencies and Logical Future

This part, jointly with the definition of the interest system and its problematic side, is named as Reference Projection. This phase of projection implies the prediction through a series of historical statistical data, or tendencies detected in qualitative form, from a consultation of experts. Through this phase, we try to predict the state or dimension of a problem in a specific future; this state is the future logical, which is the most probable or natural future.

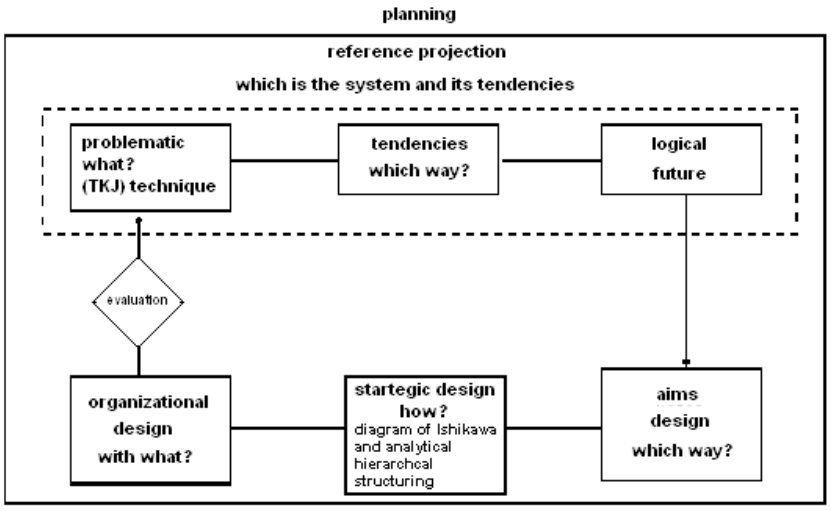

Figure 1 - Model of de Planning of Hazan Ozbeckhan.
Source: Mercado, R. E. Pag. 16, 1991, op. cit.

[1] Hazan Ozbeckhan, *Thoughts on the Emerging Methodology of Planning, in systems and Management Science*, Wiley, USA, 1974.

Normative Planning

The essential task for this phase in the planning process consists on the precise definition of the system goal.

Strategic planning

Once that the specific problem has been determined with a certain degree of detail, and the objectives have been established in a participative form, there is a more concise idea of the effort that will be necessary in order to transform the system, from its present state to the planned one. It is possible to begin now with an estimation of costs, labor, specific investments, reconstructions, etc. These resources should be used in an effective, efficient and coherent way.

Organizational Planning

After defining what is needed and how to get it, the planning model takes to the question of what resources should be considered so the system changes as it is supposed. This part finishes the cycle of the global method of planning; the execution of the operations will begin to transform the system in the predicted way, if everything was designed correctly.

Evaluation

The evaluation stage is related to the establishment of an adequate information system for the process, a system which can get (as frequently as possible) the values of the most relevant variables, in order to detect deviations from expected values and to correct them.

APPLICATION OF THE PLANNING MODEL

It is pretended to apply this planning model to telecommunications; it will allow the correct performance for their development, as well as the quality necessary for the complete satisfaction of their national and international users. Following is a description of the stages in the Ozbeckahn's model.

APPLICATION OF THE KAWAKITA-JIRO TECHNIQUE

Identifying the problematic aspect

For implementing this technique, a questionnaire was elaborated and sent to experts in the field, in order to detect the communications problematic. A total of 50 questionnaires were sent, and from their answers 31 problems were detected, as is shown in the next list:

1. Telecommunications politics
2. National telecommunications politics
3. Regional communications politics
4. Worldwide communications politics
5. Telecommunications rules
6. National regulation
7. Regional regulation
8. Worldwide regulation
9. Information security
10. Virus attacks
11. Hackers intervention
12. Efficiency of the communication systems
13. Low development in telecommunication industry
14. Difficult adaptation in the enterprises to new technologies.
15. Service integration.
16. Service lack
17. Products quality
18. High prices
19. Low quality in services
20. Incompatibility of services
21. Training
22. Low self-respect among the personnel
23. Deficiencies on people training
24. Deficiencies in the knowledge level of the personnel
25. Enterprises without research department
26. Deficient infrastructure, mainly in rural zones and small cities

27. Areas
28. Equipment
29. Work tools
30. Coordination between internet providers in Mexico, in order to offer savings to the users.
31. Low impact of wide band and cable television services in the country

Later, similar problems were gathered together; the system global problem, identified by the Z letter, included 6 main groups, identified by Yi, and the secondary aspects were marked as Xij.

Z. System total problematic
Y_1 Telecommunication politics
X_{11} National telecommunication politics
X_{12} Regional telecommunication politics
X_{13} Worldwide telecommunication politics
Y_2 Telecommunication regulation
X_{21} National regulation
X_{22} Regional regulation
X_{23} Worldwide regulation
Y_3 Information security
X_{31} Virus attacks
X_{32} Hacker intervention
X_{33} Efficiency of the communication systems
Y_4 Low growing in the telecommunications industry
X_{41} Difficulties on adaptation to new technologies.
X_{42} Service integration
X_{43} Service lack
X_{44} Quality of products
X_{45} High cost
X_{46} Low quality of service
X_{47} Incompatibility of services
X_{48} Bad coordination among Mexican internet service providers increments service cost
X_{49} Low impact of broadband and cable television services in the country
Y_5 Training
$X5_{51}$ Low self-esteem of workers
X_{52} Deficiencies in training
X_{53} Deficiency in the knowledge level of workers about engineering and other areas
X_{54} Enterprises without R&D departments
Y_6 Inadequate infrastructure in rural zones and small cities
X_{61} Areas
X_{62} Equipment
X_{63} Materials

Hierarchy of problems

Detected problems were evaluated by a program called Integral System for Decision Taking and Hierarchical Structuring; the importance of each aspect was obtained from a comparison with the data of Table I.

The relative importance of each of the six main problems, Y_i, was calculated with this program, taking into account the relations of hierarchy and intensity that each participant assigns to the different pairs of combinations (Y_1Y_2, Y_1Y_3, Y_1Y_4, Y_1Y_5, Y_1Y_6, Y_2Y_3, Y_2Y_4, Y_2Y_5, Y_2Y_6, Y_3Y_4, Y_3Y_5, Y_3Y_6, Y_4Y_5, Y_4Y_6, Y_5Y_6) and pondering the preferred element by a comparison based on the qualification scale shown in Table I. The thirty one problems of the inferior stratum are represented by X and their relative-importance percentages are calculated the same way; the addition of relative-importance percentages for each one of the Y problems gives the 100% of absolute importance of the Z problem, just as the addition of percentages for X gives the 100% of relative importance for each Y.

Table I - Relative and Absolute Importance of the Detected Problems

Problematic	Relative Importance %	Absolute Importance %
Y_1 Telecommunication politics	**23**	
X_{11} National telecommunication politics	60	0.60*0.23*100=13.080
X_{12} Regional telecommunication politics	25	0.25*0.23*100=05.750
X_{13} Worldwide telecommunication politics	15	0.15*0.23*100=03.450
Y_2 Telecommunication regulation	**19**	
X_{21} National regulation	50	0.50*0.19*100=09.500
X_{22} Regional regulation	35	0.35*0.19*100=06.650
X_{23} Worldwide regulation	25	0.25*0.19*100=04.750
Y_3 Information security	**18**	
X_{31} Virus attacks	55	0.55*0.18*100=09.900
X_{32} Hacker intervention	30	0.30*0.18*100=05.400
X_{33} Efficiency of the communication systems	15	0.15*0.18*100=02.700
Y_4 Low growing in the telecommunications industry	**17**	
X_{41} Difficulties on adaptation to new technologies.	15	0.15*0.17*100=02.550
X_{42} Service integration	14	0.14*0.17*100=02.380
X_{43} Service lack	12	0.14*0.17*100=02.040
X_{44} Quality of products	11	0.11*0.17*100=01.870
X_{45} High cost	11	0.11*0.17*100=01.870
X_{46} Low quality of service	10	0.10*0.17*100=01.700
X_{47} Incompatibility of services	10	0.10*0.17*100=01.700
X_{48} Bad coordination among Mexican internet service providers increments service cost	9	0.09*0.17*100=01.530
X_{49} Low impact of broadband and cable television services in the country	8	0.08*0.17*100=01.360
Y_5 Training	**14**	
$X5_{51}$ Low self-esteem of workers	40	0.40*0.14*100=05.600
X_{52} Deficiencies in training	30	0.30*0.14*100=04.200
X_{53} Deficiency in the knowledge level of workers about engineering and other areas	20	0.20*0.14*100=02.800
X_{54} Enterprises without R&D departments	10	.010*0.14*100=01.400
Y_6 Inadequate infrastructure in rural zones and small cities	**9**	
X_{61} Areas	55	0.55*0.09*100=04.950
X_{62} Equipment	25	0.25*0.09*100=02.250
X_{63} Materials	20	0.20*0.09*100=01.800

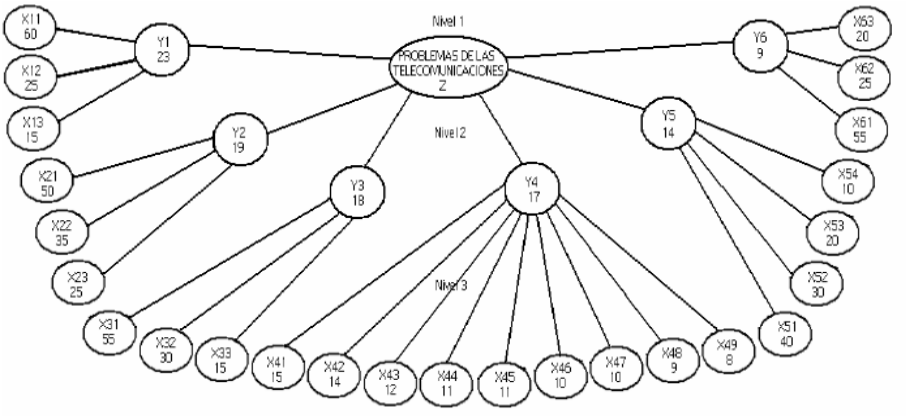

Figure 2 - Hierarchical Tree Structure of the Problem

Figure 2 shows this hierarchical tree structure, divided in three levels: the first level is the global problem of telecommunications (Z), the second level groups the six problems (Yi), and at the third level appear the thirty one problems represented by (Xij); the graphic ends here because each one of the elements cannot be divided into simpler problems to consider.

PRINCIPLE OF PARETO

The principle of Pareto (principle 20-80) establishes that if we consider the 20% of the most important problems, and we add the absolute importance of each one, we get approximately the 80% of the absolute importance for the total problem. This means that we need to solve the 20% of the principal problems and not to waste our efforts and resources in the remaining 80%, due to their low impact in the global problem.

ISHIKAWA TECHNIQUE

This technique, also known as fish skeleton, was used (combined with the TKJ technique) to detect the reasons of the problems, through an extensive revision of the questionnaires given to the experts. Then, after a process of summary, seven general causes were obtained, with specific causes per problem.

Table II - Absolute importance and amount of Pareto from high to low importance

Problems in significance order	Element	Absolute importance (AI)100%	Pareto amount 100%
National communications politics	**X11**	**0.1308**	**0.1308**
Virus attacks	**X31**	**0.0990**	**0.2298**
National regulation	**X21**	**0.0950**	**0.3248**
Regional regulation	**X22**	**0.0665**	**0.3918**
Regional communications politics	**X12**	**0.0575**	**0.4488**
Low self-esteem of workers	**X51**	**0.0560**	**0.5048**
Hacker intervention	**X32**	**0.0540**	**0.05588**
Areas	X61	0.0495	0.6083
Worldwide regulation	X23	0.0475	0.6558
Deficiencies in workers training	X52	0.0420	0.6978
Worldwide communication politics	X13	0.0345	0.7258
Deficiency in the knowledge level of workers about engineering and other areas	X53	0.0280	0.7538
Efficiency of communication systems	X33	0.0270	0.7808
Difficult adaptation to new technologies	X41	0.0255	0.8063
Services integration	X42	0.0238	0.8301
Equipment	X62	0.0225	0.8526
Lack of service	X43	0.0204	0.873
Quality of the products	X44	0.0187	0.8917
High cost	X45	0.0187	0.9104
Materials	X63	0.0180	0.9284
Low quality of some services	X46	0.0170	0.9454
Incompatibility of services	X47	0.0170	0.9624
Coordination between the Mexican internet service providers to offer savings to the user	X48	0.0153	0.9777
Enterprises without R&D departments	X54	0.0140	0.9917
Low impact of broadband and cable television services in the country	X49	0.0081	0.9998

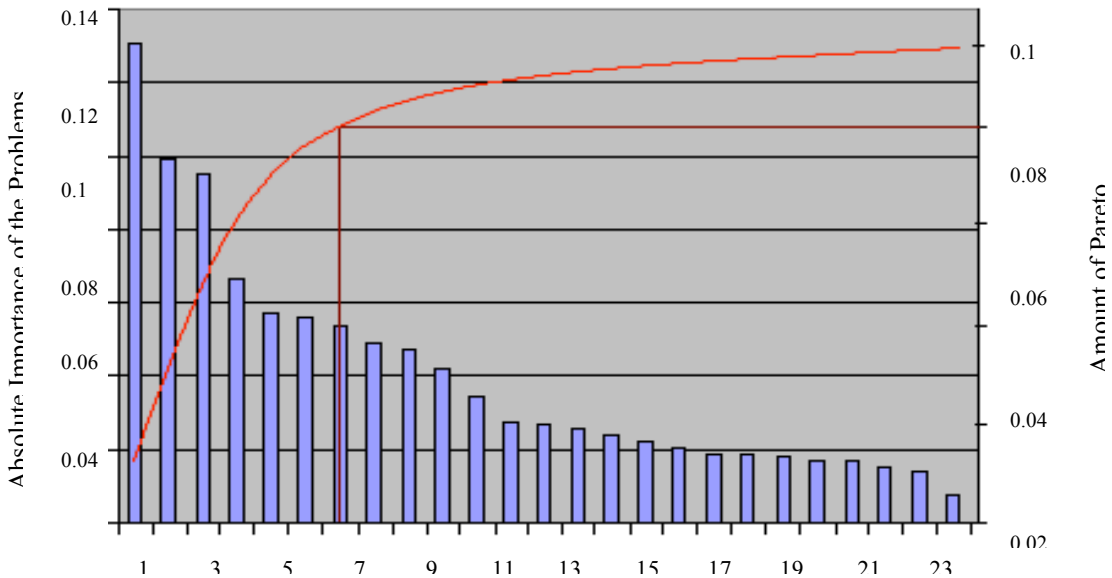

Figure 3 - Problems Ordered from Greater to Shorter whose Absolutes Importance Amount Gives the Pareto´s Amount.

Relation of Problems and Their Specific Causes

National Communications Politics
- Lack of information given to population about the development of telecommunications
- Insufficient training to the general population for the use of the telecommunications
- Lack of communication in some communities in the country
- Protectionism for supporting national companies

Virus Attacks
- Careless practices from programmers
- Lack of protection, especially vaccines
- Lack of care from users

National Regulation
- Frauds
- Inadequate promotion
- Affectation to audio & video enterprises
- Low development level of telecommunications

Regional Regulation
- Incompatibility in the services
- Inadequate publicity
- Affectation to audio & video enterprises
- Low development of telecommunications

Regional Communication Politics
- Lack of information given to population about the development of telecommunications
- -Lack of collaboration among Latin America countries
-Protectionism for supporting national companies

Low Self-Esteem of Workers
-Lack of incentives at work
-Low personal interactivity at work
- Lack of information of the objectives and goals of the enterprise

Hackers Intervention
- Use of programming mistakes
- Piracy of programs
- Inadequate programming techniques

In the same way, the general and specific causes of each considered problem can be found.

Next, an example of the Ishikawa schemes with their general causes is presented (Figure 4).

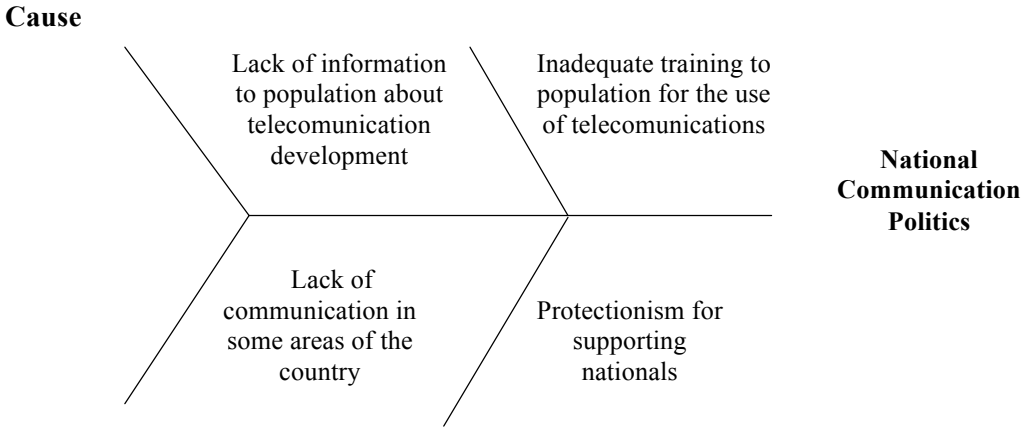

Figure 4 – Ishikawa schemes

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