

Information Technology and Organizational Change
"Empresa Metropolitana de Transportes Urbanos - EMTU"
Recife, Brazil.

A Plan B Paper

by
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Information Technology and Organizational Change

"Empresa Metropolitana de Transportes Urbanos - EMTU¹"

Recife, PE - Brazil

Main question: Given the changes and tendencies in the institutional, political, and economic settings in Brazil, how should EMTU/Recife be redesigned to function well in the rapidly changing, information-rich, knowledge-intensive society and economy of the 1990s?

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⁴Passengers Public Transport System

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[Some of the judgements and suggestions in this paper are based on the author's eleven year tenure⁶ as a professional employee in the areas of regional planning and system analysis. In addition, during the preparation of this paper, the author has been in personal communication with people⁷ in Recife who have current knowledge of the EMTU.]

Given the changes and tendencies in the institutional, political, and economic settings in Brazil, how should EMTU/Recife be redesigned to function well in the rapidly changing, information-rich, knowledge-intensive society and economy of the 1990s?

Not only to survive, but also to grow and evolve towards the future, EMTU/Recife has to cope with these changes.

⁵Metropolitan Public Transport Agency.

⁶System analyst for FIDEM, a regional planning agency in Recife (3 2/3 years); development adviser for the project "MINTER/RM/BIRD" - Minister of the Interior of Brazil, Metropolitan Regions, and World Bank (2 years); and head of the Information and Computer Sciences, and deputy of the Planning Department for CBTU-STU/REC - "Companhia Brasileira de Trens Urbanos" - Superintendency of Recife (6 years).

⁷Carlos Guido Azevedo (consultant) and Laedson Bezerra Silva (CBTU).

I. Background of the political, economic and institutional frameworks in Brazil.

A. Establishment of metropolitan planning in Brazil.

The concept of regional planning was initiated in Brazil when the National Congress through the Complementary Law # 14 (sanctioned by the President of Brazil in June 08, 1973) established metropolitan regions around eight major Brazilian cities, namely: São Paulo, Belo Horizonte, Porto Alegre, Recife, Salvador, Curitiba, Belém and Fortaleza. Four of these eight regions created Metropolitan Public Transport Agencies ("Empresas Metropolitanas de Transportes Urbanos - EMTU"). With the exception of EMTU/Recife, all these agencies were dismantled.

To cope with the transformations, EMTU/Recife needs to be reinvented. I believe that the underlying element of the change should be Information Technology; allied to more democratic and representative channels of communication with local communities and with the political system. In addition, there should be investments in a new concept of organization, a new organizational culture, a new process of control, and a new process of planning. I agree with Light⁸, when he advocates the substitution of the dominant command-and-control approach for capacity building (class notes). "Hierarchical, centralized bureaucracies designed

⁸Paul Light is Professor of the Humphrey Institute of Public Affairs, University of Minnesota.

in the 1930s or 1940s [in the USA] simply do not function well in [the 1990s]" (Osborne 12).

In the case of São Paulo, for example, its EMTU was dismantled in July 1980 (less than two years after its creation) "by the new state government on the basis that the agency was a source of conflict and tension among the different levels of decision makers and sectorial executive bodies involved. It was felt that planning was not the best mechanism to solve these conflicts and tensions. This was clearly a political decision of an administration not concerned with planning and socially oriented solutions" (Barat 249-251). As Barat further states, "[i]t was a decision taken despite the important and useful role EMTU/SP played in the co-ordination and implementation of transport programmes and projects for the metropolitan area of São Paulo."

B. Recent history of the social, political and economic environment in Brazil.

To better analyze EMTU⁹ and its environment, it is relevant to discuss the recent evolution of the social, political and economic settings of Brazilian reality.

Brazil is a federal republic with a presidential¹⁰ system. There are three independent powers: the Executive, the

⁹From now on, every time I mention EMTU, I refer to EMTU/Recife.

¹⁰There is a possibility of a shift to a parliamentary system.

Legislative, and the Judiciary. The legislature consists of the House of Representatives and the National Congress.

The nation has had predominantly civilian bureaucracies, alternated with periods of military intervention. It is now suffering its worst crisis since 1964, when amid social and economic turmoil, the military suspended the legislature, and overthrew the elected president and the civilian rule.

The autocracy (and technocracy) initiated in 1964 banned the freedom of expression, outlawed political activism, and distorted the concept of civil society: "civil" had its meaning narrowed down to "opposed to military," and "society" meant little more than "a handful of citizens using the weight of their institutions and their moral stand to keep the notion of democratic values alive" (Harazim 23). Institutions such as the Brazilian Bar Association ("Ordem dos Advogados do Brasil - OAB"), the Brazilian Press Union ("Associação Brasileira de Imprensa"), the National Brazilian Bishop's Conference ("Conferência Nacional dos Bispos do Brasil"), among others, became the face and voice of the minority opposed to the authoritarian regime. "This illustrates how the meaning 'civil society' can be narrowed when basic liberties are at stake" (Harazim 24).

Nevertheless, Brazil was economically successful during the 1970s. After examining Table 1 and the Figures 1, 2, 3, 4, and 5 (which display graphically the growth of per capita

income, gross domestic income, GNP, gross domestic investment, and private consumption), one can perceive why the 1970s are called the decade of the "milagre econômico" (economic miracle). There is no doubt of the Brazilian economic success during the 1970s. The rule was to promote economic development at any cost. According to a World Bank report, "Brazil was able to achieve and sustain one of the highest rates of growth recorded by any developing nation in the era following World War II, as real GDP accelerated from a 3.9 percent average annual growth rate in the 1964-67 period, to a 10.5 percent pace in the 1968-74, expanding in per capita terms by more than 8 percent."

Despite its economic performance during the 1970s, the 1980s were considered the lost decade from the social point of view (Dinsmoor). According to the Gini¹¹ index of relative inequality, Brazil now has the third worst income distribution of the world. The economic success of 1970s did not promote social development. It is not morally acceptable to discuss economic growth, unless the discussion is linked to a social development policy.

During the 1980s, as the military rule slowly began to collapse, the nation went through the process of "abertura" (opening toward a civilian regime). Various segments of society became visible and vocal in public affairs. More

¹¹The Gini index is a commonly used distributional measure of relative inequality, which is related to the Lorenz curve (Weimer 109).

people began to interact as citizens on a broadened national agenda. Issues related to the environment, preservation of the national culture, Indian rights, the role of women, homosexuality, nuclear energy, abortion, divorce, etc, became less ideologic. "It was a sort of awakening to social activism, the discovery that individual concerns can become common interests, and that militancy is also possible outside the more traditional forums of political action - parties, trade unions" (Harazim 25). The Catholic church played an important role with its efficient network of parish associations ("Comunidades de Base"), which began rallying those segments left aside: the non-citizens, the hard-pressed city-dwellers, the rural poor, the migrants, the homeless, etc. "Neighborhood associations, traditionally aligned to local politics, started looking for other ways to build common grounds" (Harazim 26).

Also in the 1980s, the nation began to observe the first evidences of the weakening of the centralizing process of the public sector, which began in the 1930s, and was intensified in the period 1960-1980 (Azevedo 7).

"Centralized institutional planning responses to local problems are likely to alienate local populations and local government" (Friedman, in Barat 225). The Brazilian Constitution of 1988 established the principle of the administrative decentralization, and transferred power and taxing authority to the state and local governments which

had belonged to the federal government's discretion (Azevedo 7).

The decentralization process, however, has not been going smoothly. There has been some reluctance to decentralize the institutional planning framework. Traditionally, Brazil has not favored the decentralized approach. "A more decentralized approach to transport planning would ... require greater political and financial autonomy at the local level - particularly for urban areas, where infrastructure costs are much higher. Decentralization also requires an institutional apparatus for the devolution of decision-making which may be more extensive than is politically acceptable or too much for the administration to cope with" (Barat 225).

Nevertheless, the decentralization process has been instituted and will be much more intense in the coming years, particularly in the transport sector (Azevedo 7). As an example, the passenger rail system ("CBTU¹² - Companhia Brasileira de Trens Urbanos") is being transferred from the federal to the state level.

Besides the national decentralization process, EMTU has to deal with the complex challenges facing a metropolitan area. It has to be well prepared to deal with conflicts and to assure the effective integration of metropolitan services.

¹²Brazilian Urban Train Company

For this, it is very important to build more democratic and representative channels of communication with local communities and with the political system. Issues such as fairness, equity, accountability, and administrative morality are present in the actual political agenda.

Despite its political advancement, the nation is experiencing severe social and economic problems, as economic activity was depressed by widespread uncertainty and high inflation. By the time of the inauguration of President Collor¹³ in March of 1990, monthly inflation had reached circa 80%, the highest in the nation's history. In spite of the failure of two economic plans, the monthly inflation is now being kept around 20%.

II. Perspective of regional planning in Brazil.

A. Deficiencies in the institutional planning framework.

There has been a lack of understanding of what is meant by regional planning. It has been characterized by the drawing up of shopping lists of projects for implementation. Rather, planning should be understood as a process of articulating objectives, and designing efficient and effective means of attaining them. In addition, it is very important to "establish institutional planning frameworks to resolve conflicts which invariably arise in the course of planning" (Barat 226).

¹³The first president elected by the people after 1964.

B. The creation of FIDEM¹⁴ - Fundação de Desenvolvimento da Região Metropolitana do Recife (July 03, 1975).

The Recife Metropolitan Region ("RMR - Região Metropolitana do Recife") was established by state law # 6708, of June/17/1974. Two councils were created: the Deliberative Council and the Advisory Council. The former was in charge of working out the Integrated Development Plan ("PDI - Plano de Desenvolvimento Integrado") for Recife Metropolitan Area, and to coordinate the execution of programs of metropolitan interest. The latter was charged with gathering opinions, giving advisory support related to metropolitan issues, and suggesting regional plans and actions related to common services.

Metropolitan services included:

The integrated planning for the social and economic development of the region.

Basic sanitation (water supply, sewer system, solid waste and drainage¹⁵).

Land use planning.

Transportation.

Production and distribution of gas.

¹⁴Regional Planning Agency in Recife.

¹⁵The region is partially below sea level.

Protection of watersheds/wetlands, and environmental control.

The state law # 6890, of July/03/1975, authorizes the executive power to institute the Metropolitan Planning Agency (FIDEM - Fundação de Desenvolvimento da Região Metropolitana do Recife"), which was subordinated to the Planning Secretary of the State of Pernambuco.

As an important tool for metropolitan planning, FIDEM designated Land Zoning/micro-planning areas ("UERS - Unidades Espaciais de Referência") to gather information to support regional and urban planning. These UERS are aggregations of census tracks assembled by social-economic and physical-environmental aspects.

To support regional planning, FIDEM produced the so-called "ortofotocartas," which are orthogonal projections of aerial photographs, in the scales of 1:2,000 and 1:10,000.

In March 19, 1984, an agreement among FIDEM, CELPE (electricity), TELPE (telephone), COMPESA (water and sewer), and 12 Municipalities, initiated the "Projeto Unibase," which was the unification of the cartographic information.

By this time, FIDEM had become dependent on a modern computer system, extensive databases, computer-assisted mapping, and on a sophisticated software¹⁶ for

¹⁶GRADIS 2000, developed by CONTRAVES, Zurich, Switzerland.

"geoprocessamento de dados" (geographic data processing).

- C. The creation of EMTU¹⁷/Recife - "Empresa Metropolitana de Transportes Urbanos" (1980).

Having described the environment, let us now focus on the STPP/RMR¹⁸ (or simply STPP), and on the EMTU.

Because of the lack of coordination among the different levels of government within the institutional planning framework for transport, and the concern with the improvement of the public transportation system in Recife, important institutional changes were introduced in 1980. The State Government created the EMTU to manage the STPP. Its major source of funding has always been the "Remuneração por Serviços Técnicos - RST," a tax which represents 4% of the fare (initially it was 2.2%). EMTU has also counted on minor funding from the State and from federal sources through the "Fundo Nacional de Desenvolvimento dos Transportes Urbanos - FDTU" (National Fund for Urban Transport).

The urban population of Pernambuco in 1980 was 3.8 million, circa 74% of total of the state. 2.1 million were located in the Recife Metropolitan Region. By year 2000, it is projected that these figures will grow respectively to 6.3 and 4.0 million. It is also projected that the income of

¹⁷Metropolitan Public Transport Agency.

¹⁸Passengers Public Transport System for Recife Metropolitan Region.

the urban population will experience a growth of 5% per year for the period 1992-2000 (Azevedo 7).

When EMTU began its operation, circa 1.2 million passengers per day were transported by a fleet of 1,255 buses. The average age of the fleet was then 3.9 years. Today these figures have changed to 2.4 million passengers per day and 2,180 buses. In 10 years, it is expected that the system will transport 3.5 millions passengers per day and will require a fleet of 3,000 buses.

It can be assumed that the economic turbulence of the nation will persist for some years, and there will be a shortage of public financial resources for investments in the transport sector.

Environmental protection will be a strong item of the national agenda. The demand for less polluting vehicles will increase.

In addition, as a consequence of the democratization of the political process, there will be a predominance of social issues. The society will urge the government to pay back the so-called social debt from the 1980s.

D. The inauguration of the Light Rail System (1985).

In 1985 the Light Rail System ("Metrô") was inaugurated, linking the Center of Recife to Werneck (6.5 Kilometers). This system now operates 22.5 Kilometers of track, linking

Recife to Jaboatão and the new bus terminal.

III. Analysis of EMTU.

A. The "STPP¹⁹ - Sistema de Transporte Público de Passageiros," before and after EMTU.

In 1979, one year before the creation of EMTU, the STPP was characterized (Azevedo) by:

An excessive number of routes;

An excessive number of bus companies;

Lack of qualifications of the bus companies;

Operational distortions;

Institutional distortions²⁰;

Lack of regulation; and

Lack of transversal routes. (Most of the routes were radial; only three were transversal).

After the creation of EMTU in 1980, the following features were implemented (Azevedo):

An exclusive concessionary power, without operational capabilities;

¹⁹Passengers Public Transport System.

²⁰The "Companhia de Transportes Urbanos - CTU" (Urban Transportation Company) is simultaneously an operator and a concessionary power.

A compact organizational structure;

A new concept of enforcing the regulations (well trained enforcing officials with the objective of educating the bus companies);

A new way to negotiate with the bus companies (specific task forces);

The first conceptual model for regulating the operation of the STPP.

The operating manual for the STPP;

The zoning of the metropolitan region (RMR) into sixteen zones;

The "Operating Permit" ("Termos de Permissão - TP"), valid for five years;

The Light Rail Transit ("Metrô") which should not compete with the trolleybus nor with the bus;

The integration of the fares and physical aspects of the transportation modes;

The rationalization of vehicle flow in the central city;

The metered and peripheral parking;

Forty new transversal routes;

The concept of circular routes;

A fare policy with ring zones;

The management of student passes; and

The operational schedule for buses.

B. The institutional aspects.

According to the "Plano de Ação" of EMTU, the following has been the major institutional interventions on the STPP:

Assimilation (by EMTU) of the region's inter-urban and municipal transport;

Regulation of reduced fares for students;

Creation of the "Remuneração por Serviços Técnicos - RST," a source of funds for the operation of EMTU (4% of the fare).

Transformation of the Administrative Council of EMTU in a Metropolitan Council for Urban Transport by increasing the number of members.

Elimination of some of the existing free passes.

The following are some of the results of these institutional changes:

Creation of an organization exclusively dedicated to

the management of the STPP, and endowed with financial and administrative authority;

Better coordination of actions related to the improvement of the STPP; and

More accountability.

C. The operational and fare related aspects.

Of the various operational changes, one of great significance was the implementation of the "Câmara de Compensação Tarifária - CCT" (Chamber for Fiscal Compensations), which worked as a "fiscal disparities plan" for the bus system funding.

As far funding is concerned, EMTU made it possible for the bus companies to receive low-cost financing for the renovation and enlargement of the bus fleet. The funding came from the "BNDES - Banco Nacional de Desenvolvimento Econômico e Social" (National Bank for the Economic and Social Development).

Another important intervention was an increase in the investment in training of the maintenance and operational staff of the bus companies.

D. The organizational aspects.

Based on strategic plans, EMTU designed action plans, which were followed up according to a system named "CAA: Controle,

Avaliação e Acompanhamento" - a sort of command-and-control approach.

This approach has worked fairly well, however the new environment urges changes into a more flexible system, which has to be based on **capacity building**. The new setting has to emphasize **cooperation** and **trust building** among bus companies, local governments, state government, federal government, and EMTU.

E. The basic legislation and powers.

The creation of EMTU is also related to the institutionalization of the "Sistema Nacional de Transporte Urbano - SNTU" (National System of Urban Transport), through law # 6261/75 (1975), which established and created, at the federal level, the "Empresa Brasileira de Transportes Urbanos - EBTU" (Brazilian Agency for Urban Transportation). EBTU was created in 1975 with the overall responsibility for the country's urban transport planning and finance decisions. This agency was assigned the task of directing all financial and planning aspects of urban passenger transportation for all modes of travel. The dismantlement of EBTU in 1990 has resulted in the emasculation of SNTU, transferring all decision-making and actions of coordination to the local level.

The creation of EMTU strengthened metropolitan power. The new constitution (of 1988), however, strengthens the

municipalities.

EMTU has effective control of the STPP in the municipality of Recife (the central city), and in the inter-urban transit of the metropolitan region. However, with the exception of Recife, no agreement was signed with any of the other municipalities of the region.

The growing population and economic development of the municipalities of the region requires the creation of routes inside these municipalities. These routes are not under the control of EMTU. However, the modal integration of the bus system with the "metrô" (Light Rail System), with the trolleybus, or with the train, depends strongly on the creation of such municipal bus routes.

F. The mission.

The mission of EMTU is to promote, in the metropolitan region, the mobility of people according to their needs, and to consider safety, quality and cost standards; all compatible with and acceptable by the community of users.

In other words, the regional transportation system should support the region's economic vitality and quality of life, and provide for safe, efficient movement of people through strong, effective highways and transit components.

Also part of the mission is the promotion of modal integration, both physically and fiscally.

In its mission statement, EMTU also expresses its preference for private ownership and operation of the bus companies.

A similar approach has been stated by the Twin Cities Metropolitan Council, in Minnesota. "By providing ready access to virtually any location in the region, the transportation system makes it possible for the region's residents to take advantage of a broad range of opportunities for employment, education, shopping, recreation, health care, housing and cultural activities. As a means of conveying goods, services and workers, the transportation system plays a crucial role in supporting the region's economy and enabling it to grow" (Metropolitan Council 4).

Within this framework, EMTU plays the social role of a concessionary power, regulator and manager of the STPP.

G. The key actors.

According to Bryson's definition, an actor²¹ is "any person, group, or organization that can place a claim on an organization's attention, resources, or output, or is affected by that output" (52). As Bryson further states, "the key to success in public and nonprofit organizations is the satisfaction of key stakeholders" (52).

After a thorough analysis, EMTU was able to identify five

²¹A stakeholder or a constituency.

important actors or group of actors, with strong economic and/or political interests, most of the time conflicting interests:

The State Government;

The Town Hall of Recife;

The Other Town Halls in the metropolitan region;

The Bus Companies; and last, but not least,

The Users of the transportation system.

In the case of EMTU, the identification of these actors has an additional significance, as we compare their power with the fragility of EMTU's institutional base. The possibility of temporary alliances among the key actors adds more complexity to the way EMTU should act. The institutional fragility of EMTU is associated to constitutional restrictions (from 1967, and specially from 1988) concerning the metropolitan authority (Azevedo 10).

Undoubtedly, that was one of the most important reasons, why the EMTUs of other Brazilian metropolitan regions were dismantled (Azevedo 11). According to Azevedo, the most important characteristic of the ongoing public sector reform is the strengthening of the municipalities. Thus, EMTU cannot rely only on the concept of the power of the metropolitan authority.

Referring to Bryson's strategic planning approach, the identification of the key actors should be followed by the identification of "their stake in [EMTU] or its output, their criteria for judging the performance of [EMTU], how well [EMTU] performs against those criteria, how [these actors] influence [EMTU], and in general how important the various [actors] are" (52).

H. The political support.

Despite the lack of political support at the local (governmental) level; the lack of comprehension and knowledge about the functions and the importance of EMTU, its actions and the changes it has implemented in the STPP, there is a strong political intent in the State Government to strengthen the authority of EMTU.

EMTU has a good technical and administrative staff, and is very open to adapting to the new reality. It is essential that EMTU build strong relationships the with the political system, and with the key actors.

I. The organizational structure.

EMTU was created with a compact organizational structure. However, it has evolved into a hierarchical organization (see the attached organizational chart), with undefined and even overlapping functions, as implemented in February of 1992. Some EMTU units function in isolation without any

concern with the wider objectives of the organization (Azevedo).

Excessive red tape and administrative rigidity are other factors that have been jeopardizing the performance of EMTU.

The efficient and effective management of the transportation system demands agile decision-making, and harmony among the various functional units of the organization.

J. The funding.

The tax "Remuneração por Serviços Técnicos - RST," has always been the main source of revenue for the operation of EMTU. Initially this tax represented 2.2% of the fare, and later it was increased to 4.0%. In the beginning of its operation, EMTU counted on some budgetary transfers from the State Government, which have never represented more than 5.0% of EMTU's total revenue. It received also some federal funds (also a small percentage) from EBTU through the "Fundo Nacional de Desenvolvimento dos Transportes Urbanos - FDTU" (National Fund for Urban Transport).

IV. Information Technology and Organizational Change.

A. New concept/model of organization.

"The new information society will be more turbulent and complex than the previous industrial society" (Sankar 187). Everyday, organizations, public and private, profit and

nonprofit, are created in the world. Those who come through have the following characteristic in common: their capacity to adapt to the changing environment (Azevedo 5).

Due to inflexibility and incapacity to cope with a new political, business, technologic, or financial settings, organizations age and die too precociously.

To survive and evolve towards the future, EMTU must adopt a more **entrepreneurial** concept of organization, and think through all alternatives of fulfilling its mission.

"The fact that government cannot be run just like a business does not mean it cannot become more entrepreneurial, of course" (Osborne 22).

In addition, EMTU should encourage any divestment of functions which are not directly connected to its business. This includes functions that can efficiently be provided by the private sector.

However, despite the highly encouraged participation of the private sector, it should always be stressed that the institution EMTU is strongly rooted in the following premise (Azevedo):

It is an unalienable right of the state to administer the concessions of services of public interest, concerning the STPP.

This means that EMTU has the legal mandate from the state to exercise the concessionary power over the STPP in the Metropolitan Region of Recife.

Nevertheless, EMTU cannot rely solely on the legislation nor on its legal mandate. It has also to invest heavily in its image of unquestionable technical competency and act consistently with this image. That is the only way EMTU will become, de facto, the effective concessionary power for the government, the entrepreneurs, and the community, in general.

B. New organizational culture.

Culture can be understood as the integrated pattern of human behavior that includes thought, speech, action, and artifacts. It depends upon one's capacity for learning and transmitting knowledge. Thus, culture is constituted of norms, rules, beliefs, and values.

"What does culture do? What functions does it serve? How does it originate, evolve, and change? Why is it so difficult to change culture?" According to Schein, "culture is a **dynamic process**." (Emphasis added).

Concerning "organizational culture," I agree with Schein's point when he argues that this term "should be reserved for deeper level of **basic assumptions** and **beliefs** that operate unconsciously, and that define, in a basic 'taken-for-

granted' fashion, an organization's view of itself and its environment." As Shein (6-7) goes on and states, "[t]hese assumptions and beliefs are **learned responses** to a group's problems of **survival** in its external environment and its problems of **internal integration**. ... Culture, in this sense, is a **learned product of group experience** and is, therefore, to be found only where there is a definable group with a significant history." (Emphasis added).

Being constituted as a well defined group with a successful and significant history, EMTU has a strong organizational culture. The challenging external environment and the necessity of better internal integration, however, **urges cultural changes**.

Concerning its external environment, "[w]hat has limited the growth of direct government as an instrument of public action has been a set of popular beliefs about its inefficiency, unresponsiveness, and ineffectiveness" (Salamon 15).

To change this external cultural scenario, the first step has to be changing the internal culture of the organization. Azevedo agrees that the underlying cultural change required for EMTU, is related to employee/organization interaction. He advocates a new attitude, in which "trabalho-prazeroso" (work-gratifying) shall be a shared and preserved value. It should be substituted for the old concept of "trabalho-

obrigatório" (work-compulsory) or "trabalho-sacrifício" (work-sacrifice).

This cultural change is based on the capacity building approach, in which the board of directors will not need to be over-concerned in monitoring themselves all outcomes. They will delegate authority and responsibility to the various organizational units and to self-managed teams (SMTs). It implies the **decentralization of the decision-making process**, and galvanizes the process of **building trust, motivating, and developing of managerial capabilities**. In addition, it provides a better environment for **innovation** and for **cooperation**, as well.

According to Fulton²², the greatest barrier to cooperation is fear; and to overcome fear, there is nothing better than building trust (class notes).

This new culture will place heavy reliance on self-managed teams (SMTs) as a means of fostering more rapid innovation. The leadership theory that adopts a person-centered approach should be abolished. Instead, a **distributed leadership model** is far more appropriate. (Barry 32).

C. New process of control.

According to Light, the command-and-control approach to management, has been the preferred model of management in

²²Tom Fulton is the President of the Minneapolis/Saint Paul Housing Fund.

the United States of America, for both private enterprises and public agencies. As a result, there has been too much stress in monitoring, and very little on capacity building. Light argues that the reason monitoring is still the preferred model is that it is easier and cheaper than capacity building, and is also politically attractive (class notes).

"The kind of governments that developed [according to this model of management], with their sluggish, centralized bureaucracies, their [excessive] preoccupations with rules and regulations, and their hierarchical chains of command, no longer work very well. They accomplished great things in their time, but somewhere along the line they ... became bloated, wasteful, ineffective" (Osborne 11-12).

The world is changing, and EMTU cannot fail to change with it.

For this, EMTU has to substitute its command-and-control approach to management, known as "CAA - Controle Acompanhamento e Avaliação," for the new process of permanent control ("PCP - Processo de Controle Permanente").

This new process (PCP) is based on capacity building and has its basis in managerial autonomy. Contrariwise, the old process (CAA) is rooted in the assumption of a strongly centralized approach to management.

D. Adoption of flexible planning.

This new process of control does not match with the existing rigidity of the planning process. The new approach to planning has to be **flexible, innovative, and visionary**.

The key to success of this new planning is **flexibility** (not predictability). Flexibility to help EMTU to cope with the new reality, to draw lessons from wrong decisions, and to do so with the minimum costs. Flexible planning will be the planning of permanent change.

E. Information technology as the underlying element of change.

Expert systems, also known as knowledge-based systems, enable a user with a problem to consult a computer system as he or she would an expert advisor. These systems help to diagnose what might be causing the problem and give considerable support to the decision-making process (Mockler 1-2). Despite the fast development of the computer sciences, users often do not make the best use of these powerful instruments.

According to Naylor, "the state of the art of corporate planning software is at least ten years ahead of the level of sophistication of the vast majority of senior corporate executives" (184).

To make up this technological gap, there must be continuous and predominant investments in human capital.

Information technology allied to trust and capacity building is the catalyst to foster innovation in EMTU. Peters and Waterman, in In Search of Excellence (in Sankar 190) identify "creativity" and "innovation" as fundamental characteristics of excellently managed companies.

"Creativity is getting an idea. Innovation not only includes getting an idea but implementing it. Successful companies stress innovation over creativity because they expect the people who get ideas to implement them" (Sankar 190).

Information technology is not only the underlying element of change, but also the key to administrative, technical, and operational success of EMTU. To cope with the rapidly changing environment, both EMTU and its employees will have to adapt to the changes. "Flexible, well-designed computer-based systems can help workers adapt to change by way of such things as 'job aids' built into the systems" (Sankar 187).

How to put the information technology at the service of society is the challenge, not the technology, per se. It is of great importance to insist over and over on investing on human capital and capacity building. "While information technology plays a large role in the management of

technological change, the role of human information processing, with its elements of intuition, creative visualization, lateral thinking, and variety of cognitive styles, is critical. The human decision maker is still [and always will be] at the center of the organizational stage in the management of the complex process of change" (Sankar 190).

Human expertise and wisdom will never be replaced by these "reasoning" machines; only those tasks for which computers are more appropriate and even indispensable. It is common knowledge that computers are "more deliberate, more precise, and less prone to exhaustion and errors than the most conscientious human being. They can also store, modify, and tap vast files of data more quickly and accurately than humans can" (Dreyfus 44).

Consequently, information technology releases humans from computer-suitable tasks, which frequently are time consuming and boring. The outcome from this scenario is that humans will have more time to dedicate themselves to more significant tasks and use virtues and intuitive intelligence that "reasoning" machines simply cannot match.

Within this framework, the proposed information technology approach for EMTU is threefold:

First, it is related to traditional data bases and administrative systems, such as payroll, accounting,

inventory, etc

Second, it embodies the functions of planning, control and evaluation of the operation. The following systems for monitoring the operation should be implemented:

The "ODL - Operação Dinâmica de Linhas" (Dynamic Routes Operation); and

The "SIMAV - Sistema de Monitoração de Veículos" (Vehicles Monitoring System).

And third, it is more concerned with the broader issue of the communication process, which should have its roots in the model of "informática distriduída e coordenada." This model of information system takes advantages of both centralized and decentralized approaches. Centralization provides a better integration of the information system, as well as a higher variety of applications. In addition, it has the following advantages: economy of scale; better growth opportunity; and the possibility of finding solutions to complex problems.

On the other hand, the model "distribuído e coordenado" champions administrative decentralization. Decentralized institutions have the following advantages (Osborne 252-253):

First, they are far more flexible than centralized institutions; they can respond quickly to changing

circumstances and customer needs.

Second, decentralized institutions are more effective than centralized institutions.

Third, decentralized institutions are more innovative than centralized institutions.

Fourth, decentralized institutions generate higher morale, more commitment, and greater productivity.

The proposed model (see charts 1, 2 and 3) of "informática distriduída e coordenada" is, thus, organized according to five structural and functional groups, namely:

The "NTI - Núcleo Técnico de Informática," is the highest policy authority in EMTU, concerning information technology. It functions as a board, having representative leaders from the major organizational units of EMTU. It is a permanent forum, linking the various organizational units "through discussion, debate and deliberation, in order to create and communicate meaning." (Bryson and Crosby). The NTI also functions as an important arena, on which the representative leaders rely for policy making and implementation (based on the deliberations originated in the forum). Citing Bryson and Crosby's definition of courts, the NTI plays another important role, which is "to judge or evaluate decisions or conduct in relation to laws or norms" of

the information system.

The "UCI - Unidade Central de Informática" is in charge of the everyday management and control of the information system. It is a small central unit, and counts on a very specialized (in computer sciences) staff. One of its functions is to give technical support to users. In addition, the UCI is the enforcing authority concerning the norms of the information system, with direct mandate from the NTI.

The "UCO - Unidade Central de Operação" is a small central unit which is responsible for the operation, maintenance, and supply related to the data processing equipments in common use.

The "UELS - Unidades Executivas Locais" are loosely related to the organizational structure of EMTU. The UELs assemble organizational units according to the way they use the information system, and its resources.

The "UATs - Unidades de Apoio Técnico" comprises specially trained people, whose responsibility is to give technical support to their corresponding UEL. Their link to the centralized unit (UCI) is normative. They are administratively subordinated to their UEL.

V. Conclusion.

"Major efforts are underway to improve the effectiveness of public action, to conserve public resources, to promote cooperation between government and the private sector, and to find new ways to pursue public purposes" (Salamon 20).

This assertion applies to the new reality and challenges related to EMTU and its environment. I am convinced that despite the advancements of the information technology (and technology in general), **the key to success for EMTU will be a combined and coordinated effort to build trust among the different agencies and private enterprises, encouraging a higher level of cooperation.**

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