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ETHICAL ASPECTS OF SOFTWARE DEVELOPMENT AND USAGE

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Abstract: This paper describes and discusses how IT related decisions are intimately linked to ethical issues . Based on a Case Study undertaken at a large public sector organisation, software usage and organisational processes were examined in order to uncover underlying values and social control issues embedded in ´technical solutions´.

Keywords. Information Technology, ethics, organisation

1. INTRODUCTION

Information Technology (IT) opens a whole new world of relations between technology and social control issues. IT processes and distributes information along multi-directional flux. This feature is responsible for two controversial functions: (a) performance enhancement, and (b) social control. The examination of the contradictions between these aspects permits not only to propose efficient solutions from both technical and social perspective, but also to make ethical considerations.

So far, the current technology-society debate has oscillated between the technocratic and the socially determined view. In short, the former treats technology as 'neutral' and independent of the social context where it is developed or applied. The latter considers technology as a social product (Winner L., 1976; Gouldner, A, 1976; Dickson D., 1974; Therborn G., 1980; Mckenzie D. and Wajman J., 1999).

In order to illustrate how technical IT decisions are intimately linked to social related issues, a Case Study of a large public service organisation was undertaken. Specifically, software usage and organisation processes were examined in order to uncover underlying values and social control issues embedded in 'technical' solutions.

Ethical dilemmas that occurred during the technology-organisational re-design process are discussed applying three ethical framework categories: the utilitarian, the social justice and the individual rights (Velasquez., 1983; Bird and Hardy, 1994).

2. THE BRAZILIAN SOCIAL SECURITY IT AND ORGANISATION

The main goal of the Brazilian social security system (BSSS) is to manage and deliver social security benefits to the general population. Tasks performed by BSSS operators include: to receive customer information, examine social conditions, assess presented documentation, evaluate suitability of demanded benefit and entry data to the IT system. Final decision to grant or not a specific benefit is centrally done either by the IT system or by the hierarchy, in exceptional cases.

BSSS poses a highly centralised IT system with a modular data base. At lower hierarchical levels, operators must simply 'feed' the IT system with customer information. Decision to grant or not a particular allowance is made centrally by the IT system. This centralised/hierarchical structure aims to avoid frauds, non declared

obits, excessive high allowances granted, as well as identify homonymous and double allowances. In special cases, key customer information need to be changed or alternative payment orders need to be issued. Only authorised middle management can access the IT module for updating information. The logic embedded in the IT system is to deny any power for decision making to operators who are reduced to data entry operators.

BSSS' organisational structure is also highly centralised. In the early stages of the BSSS, few benefits existed and rules were simple and clear. Therefore, both standardised and centralised work flows, work processes and IT processes were adequate to process demanded benefits in high volume.

Nowadays, the hierarchical and centralised IT and organisational structures are inefficient because of two reasons: (a) BSSS has implemented many additional benefits. Today there are approximately 80 different benefits, each one with different rules, norms, pre-requirements and demanding different work flows and examination pattern. (b) Hierarchical controls, embedded both in the IT and in the organisational structure, constitute an obstacle to run daily activities since BSSS operators tasks are partly standardised and partly highly varied. As a result, centralised IT and organisational structure do not avoid frauds since dishonest public servants have 'adaptive' behaviour. The IT and organisational structure punish all cadres by tightly controlling daily activities independent of the type of task performed. In the next sections, ethical aspects underlying software design, IT and organisational structure deployment are highlighted and its relations with efforts to improve the technical efficiency of the system are discussed.

3. ETHICAL VALUES IN THE BSSS BENEFITS GRANT PROCESS

The way operations are deployed at BSSS and its efficiency degree is examined considering three levels: (a) the institution (BSSS); (b) the operator; (c) the customers. Inter-relationships among these three levels set up key ethical dilemmas since they have different rationality. Ethical dilemmas are further reinforced by the inconsistencies emerged by the centralised organisational structure and by the way the software component of the IT was designed (top-down, centralised and highly hierarchical).

BSSS operators need to cope with two types of conflicts in their daily activities. On one hand, in many situations, it is difficult to legally justify the grant of a benefit/allowance which, by law, a person is entitled. On the other hand, in other situations, norms permit to grant some benefits to people who, in fact, are not entitled to. The latter situation is defined as a 'white fraud'. Two cases illustrate this situation. First, the 'rural pension' benefit is the case in which a person's declaration is sufficient to verify the type of occupation and time of work. Second, the 'maternity allowance benefit, set up only to domestic workers, represents the case in which the labour contract can be formalised post-fact, enabling the arrangement of a labour contract which does not necessarily reflects real wages earned by the customer.

These situations uncover different logic which operates at different levels (institution, operator, customer) and exposes BSSS operators to organisational contradictions and ethical conflicts. At the level of the institution, the intention is to achieve social justice by recognising granted rights. A key reason for this to occur is the historically determined fragile working relations that do exist in some social groups such as in the case of the rural and domestic workers. Usually, rural workers have hardly formalised or registered their professional records. In these cases the institution recognises the person's rights and set up exceptional administrative procedures in

order to enable the granting of benefits. It is crystal clear here the attempt to achieve social justice principles. However, the way informal relations are 'formalised' frame operators in paradoxal situations and open ways for misuses of the BSSS system.

The main problems for the operator do emerge from the inconsistency in the interplay of (a) social realities which are highly ill defined and (b) norms and legal procedures which are rigid and standardised. The institution has decided to address this problem through additional administrative rules and procedures that are IT controlled. How should the operator perform if the social situation of the customer is ill defined, norms and rules are rigid and he/she does not have enough leeway to make the final decision despite he/she have higher capacity to understand the real social situation of the customer?

4. LAW INTERPRETATION DILEMMAS

Even within the highly centralised IT and organisational structure, operators are required to interpret specific law since the status of some pre-requirements or documentation examination need to be performed by the operator based on existing norms. This opens the possibility of emerging different and divergent interpretations. This happens not only because the law is not clear but also because it is difficult to train all operators in all different social situations. Jurisprudence 'in-house' does not exist and little legal support does exist in local BSSS agencies.

For example, in the case of benefits, which are obtained through judicial proceedings, significant interpretation-related difficulties emerge. Since legal language is used in judicial decisions, operators experience difficulties to understand legal decisions. This opens room for different 'interpretation' from different operators since they have different work experience, norm's knowledge, values, world vision and intentions. Different interpretation of the law occurs despite the existence of information regarding laws available in the IT system. Operators used to say that "each operator has his/her own way to interpret the law".

This situation may be addressed, only in part, through better communication and clear explanation of the law. This is because understanding involves interpretation, something that goes beyond the simply knowledge of the law. Interpretation of differences may be addressed not only by facilitating access to information but also by debating ideas. Therefore, organisational processes and managerial practices should permit ideas confrontation in order to build a common base of reference. The hierarchical IT system, that cause difficulties for lateral communication (e.g. inter-exchange of information between agencies) seems to be one of the barriers to enable flow of information and experience. As a result, ethical conflicts that emerge in interpreting norms, even in cases in which technically correct procedures (i.e. following the rule) are performed, may contribute to both operational inefficiency (e.g. decision delayed because of the need to re-examine special cases) and unfair decisions, which in turn, may hails customers' individual right and BSSS social justice goals.

5. PERFORMANCE MEASUREMENT SYSTEM ISSUES

In order to improve operations, BSSS implemented a Performance Measurement System (PMS). Quantitative indicators are directly extracted from the data base of the IT system. The idea was to use indicators in order to diagnose problems and evaluate current performance. However, PMS was more used as a means of social control than as a tool to improve operations. This pressured operators to improve productivity by stressing quantitative results (i.e.,

number of benefits processed) and downgrading the quality of decisions made.

The way the PMS was deployed arised ethical issues. First, from the utilitarian perspective, quantitative indicators do not contribute significantly to improve performance since qualitative aspects of operator's tasks, such as law interpretation and examination of the demand of a potential customer, are not considered by the IT system. Second, the fact that qualitative aspects are not considered by the IT system harms operators as part of their time spent performing qualitative tasks is not included in the quantitative indicators. This hails individual rights of operators as they are partially assessed by the IT system in which only quantitative aspects are evaluated. It should be noted that this feature of the IT system was designed by software developers.

From the utilitarian perspective, the IT system seems to be incomplete since the goal of technical control of the processes is hardly attained once indicators only partially reflect tasks performed by operators. Furthermore, the PMS embedded in the IT system support the creation of alternative control system by the local managers.

In order to overcome this problem, it was suggested to eliminate the rigid PMS that examines all agencies by the same standards. Instead, adaptive indicators that reflect local realities (e.g. typical benefits processed by a specific branch which involve a specific amount of variation in law interpretation) seem to be adequate to the high variety of benefits demanded by BSSS customers.

6. SOFTWARE RELATED PROBLEMS

The main administrative procedures to process customers` demands are all performed through an IT based software called 'Prisma' which is structured as a data base. This IT tool however, does not seem to be adequate to perform and support key tasks of operators, a feature that raises ethical considerations. The Prisma system seems to be designed along a logic of database, in which ready information is received/storaged and administrative procedures to distribute allowances are started and managed. While these tasks are important, the Prisma system does not have elements to support a series of activities that need to be performed by the operator before using the Prisma system to register and process a customer's demand. Customer orientation regarding definition of social situation status, advantages and disadvantages of claiming specific benefit/allowance, explanations of official documentation required and administrative procedures flow are some of the tasks that operators perform before officially opening a customer's file to register information. All these time consuming tasks are not registered by the Prisma IT system.

In order to minimize this situation, some operators have developed mechanisms to adapt that situation to their personal interests. Customers' files are open even if operators do know beforehand that they will not yield a benefit to a customer. They adopt this behaviour only to register their work on the Prisma system. The centralised IT architecture also favours only branch/central system communication. This implies in difficulties for branch to branch communication, a feature that may contribute to overcome law interpretation and information problems.

The way the Prisma system was developed and applied reveals additional ethical issues. Embedded on the Prisma system there is the social norm that operators should be simply data entry personnel. They should not make decisions. That is, IT system developers assumed and previously defined that work to be done by operators should be simple. From the utilitarian perspective, the way the Prisma system was designed does not

contribute to the efficiency of the whole institution. It should be noted, that software was designed and developed in the early stages of BSSS and today's BSSS demands are far more complex and varied than in its early stages. At the same time individual rights of operators are also undermined since embedded in the software there is social norm designed to use low skilled operators. This implies not only in condemning operators to perform simple/repetitive work but also to be classified as low wage and to have few opportunities to climb professional carrier paths.

7. SYSTEM OF CONTROL VERSUS SYSTEMIC CONTROL

One of the main goals of using the Prisma system was to increase the level of data security. It seems that, in order to achieve this aim, technicians decided to centre data security on the IT and, by default, did not on the user. This principle brought many implications for the operators. First, the operators have restricted access to the Prisma system. This feature not only constrains the normal development of their tasks but also demands a subordinate hierarchical position. Only upper level members of the hierarchy can authorise and simultaneously control operators` access to data. Second, because of the high variability of social situations, the centralised control constrains the operators` performance since they need to ask permission many times to have access to specific data in order to better examine a customer's demand. In the case of 'alternative payment' (i.e. out of the central IT system) for example, even simple actions that would be quickly performed by branch personnel need to be authorised by the central hierarchy.

From the utilitarian perspective, the central IT control of data, does not support the efficiency of the whole system. From the individual right perspective, the lower degree of autonomy that was 'assigned' to operators by software developers, undermined their individual rights.

A suggestion to overcome these problems includes the use of control mechanisms by results and not only by controlling processes. Higher autonomy to branches, setting up of procedures to debate law interpretation issues at branch level, direct branch to branch communication, relaxing control on formal procedures and building control on achieved results, may support systemic efficiency.

This principle to re-design the IT system has not been implemented, though the branch personnel have manifested its support. This proposal of systemic control via self-regulation stresses two ethical sound criteria: a) wider leeway for operational personnel; b) design of IT systems as a tool to support learning and shared decision making.

8. CONCLUSION

This paper has showed and discussed some ethical issues that emerged in the operation of a large public service organisation (BSSS). In spelling out ethical issues that emerged from the BSSS operation, it seems to be clear that ethical issues are the product of different and independent forces. While the case of BSSS showed that some social decisions where defined and embedded on the software, other forces contributed, significantly, to shape ethical aspects. The complexity of the law, the increasing number of benefits overtime and the high degree of uncertainty existing to define some customers` social situation, constitute some of these forces. Moreover, resulting ethical issues can be contradictory depending on a series of factors. First, level of examination (i.e., institution, operator or customer) is crucial to differentiate "outcomes" of ethical decisions. By definition, the goals of the institution do not necessarily match the operators` and customers` goals. Second, the degree of

importance of specific forces is dynamic. For example, while in a specific situation, administrative procedures embedded on the software can be overwhelmingly important, under other circumstances, a particular top management policy can be applied changing even 'normal' administrative procedures in order, for example, to facilitate granting (or blocking) benefits to particular customers(social groups). Third, "timing" of forces is also dynamic. In specific time frames, specific forces might have higher influence on ethical related issues than in other time frame.

Finally, it is important to register that all ethical issues are not only dynamic but also cross different levels of analysis and steam from very different 'arenas'. Norms, work proceses and customers` demands, for example, possess different stakeholders. Those features make the examination of ethical issues difficult. However, ethical issues examination seems to be a top priority to re-direct technology application towards socially sound goals without leaving aside technical aspects. Teaching and convincing IT developers, seems to be one of the challenges of the Human Factors working group.

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