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Sliming Lead Times in Courts of Law – a case study

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Abstract

The Court System is often criticized for not performing at its best. Cases take longer than expected. Research based on the Theory of Constraints and logistics took place in order to overcome these difficulties. The purpose of this paper is to identify reasons why civil cases do not flow through the court system as expected, and to discuss ways to shorten lead-times in the court process. A comparative analysis of two case studies, with six court departments and a representative sample of 299 civil summary cases is used. Two levels of analysis are used: one considering the total period of time a case remains in each activity, the second considering the delays in each activity. Data is analysed using statistical computation. Finding show that although the judge staff and the judge are the main constrains in the system, others may emerge if ill managed. Recommendations to shorten lead-times are provided.

Keywords: Theory of constraints, logistics, services, courts of law, time.

1 Introduction

Complaints about delays in courts of law are not something new. The Court System is often criticized for taking too long to produce results and demand for resources to feed the system during that period leads to costs higher than desired. This research started with a call for help from the Portuguese Judicial System wanting to reduce the period of time the cases remain in its Courts of First Instance before receiving a final decision. It was obvious that something was keeping the cases from flowing in the process.

Although research on logistics applied to services processes has already started (see, for instance, Chesteen, 2005; Helgheim, 2005; Hanne *et al.*, 2009), research on how to improve court system performance through lead time reduction is only starting (Hines *et al.*, 2005; Martins *et al.*, 2005; Hines *et al.*, 2004; Martins *et al.*, 2004; Martins *et al.*, 2003; Martins, 2010) and the improvement span is wide.

The purpose of this paper is to identify the reasons why civil cases do not flow through the court system as announced and expected in the Civil Code, and to discuss ways to shorten lead-times in the court process. Accordingly, the expected results from this paper are the application of logistics concepts in the court system, identification of the nodes (constraints, which in this case are activities) that keep the cases from flowing, and a set of recommendations to shorten lead-times. In order to achieve the expected results this article starts with a brief revision of literature (on logistics and constraints) and the required adjustments to the legal sector, and defines a set of hypothesis that will guide the discussion in order for the purpose to be achieved. Secondly, a sample of cases is statistically processed and the findings are analysed together with data collected from observation. Finally, conclusions on the hypothesis are produced, and limitations and topics for further research are defined.

2 Constraints and Flows in the Court System

The court system is a process (here defined as a set of activities linked together for the purpose of supplying a service) with constraints that restrain its flow and keep it from generating more value to its customers. This section aims at discussing what constraints are, the flows in the court system, the concept of value and customer in that same system, and the hypothesis to be tested.

2.1 Constraints and Flows

Over 20 years ago Eliyahu Goldratt developed this "Theory of Constraints" based on the well-known Optimized Production Technology that became most popular through his bestselling novel "The Goal" (Goldradtt, 1992). Although initially focussed on industrial applications, its principles and methodology have been widely applied in other areas such as marketing (Kendall, 1998), strategic planning (Gupta, 2004), health care services (Chesteen, 2005), or supply chain replenishment (Wu *et al.*, 2010), only to name a few. Its basic viewpoints are that any complex system has at least one factor that is restraining its goal (making money), which should be the focus of the company's effort; and a process of ongoing improvement, so that the flow of products is continuously increased and that goal of making money is continuously expanding. Nevertheless, this was not an innovative approach, as the flow management through constraint identification and process continuous improvement had been previously widely discussed, developed and applied (Ohno, 1988).

A constraint is everything that is restraining the flow of products in the system (Chase *et al.*, 2010). These constraints will turn into bottlenecks if they are in fact the ones that are preventing the system from generating more money. Referring to bottlenecks, Bylinsky (1983, referred by Browne *et al.*, 1996) affirmed that "it is where the flow of materials being worked on narrows to a thin stream". The way to improve system's throughput is by (1) identifying the system's constraint; (2) decide how to exploit it; (3) subordinate all other decisions to how the constraint will be exploited; (4) elevate the system's constraint, and (5) go back to the first step if the constraint has been broken (Goldradtt, 1990).

Theory of constraints can therefore be used to improve logistics systems since its processes are complex and resources always scarce. According to the Council of supply chain Management Professionals (cscmp.org, 2011) logistics management is "*that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements*", which is to say that generate value for the customer (Womack *et al.*, 2003). Value is defined here according to Johansson *et al.* (1993, referred by Mason-Jones *et al.*, 2000): value = quality x service_level / cost x lead_time.

2.2 The Portuguese Court System

The Portuguese court system presents the continental style. It is based on a set of predefined laws that are applied by the courts and its judges to solve conflicts. This specific court system is divided in tree main levels: Courts of First Instance, District Courts of Appeal and the Supreme Court. Each level acts as the appealing court for the decisions from the previous level. The court system is independent from governmental organizations and uses the police to execute its decisions. Nevertheless, it works itself with other organizations, but only to the extent of collecting information on the accused.

Each court consists of several departments, each with a judge and its support assistants, here called "judge staff". Judge staff receives all correspondence to and from the judge, links him to the entities outside the court (parties involved), and schedules the cases that are sent to the judge on a daily basis.

As any service, moreover, as any organization, it should generate value for its customers. But what is value in a court system and who are its customers? First the costumers have to be identified. They are not only the individuals or entities involved in each specific case. "Justice" means social equilibrium so that life in society, as we know it, may be possible. As a consequence two levels of customers are to be identified regarding the court service: the several individuals or entities that submit their cases to the court, and society as a whole. Creating value for the customer is not only making "justice" (the quality of the decision produced); it is also making it on time and accurately, and therefore taking into account the service, the time or lead time, the quality, and costs (for the individual or entity and also for the society) of producing that "justice" (Martins, 2010).

2.3 Hypothesis

The previous subsection allows the identification of three of the elements that interfere in the legal process: the judge staff, the judge, and the parties involved. Besides these, physical facilities are also required for formal activities such the hearings. Access to information from databases of public organizations is also required for details concerning the parties involved and the legal cases cannot flow throughout the process until that information is available.

From the purpose and objectives previously defined, and taking into consideration the debate on constrains and flows, and the resources identified as potentially influencing the flow of cases, the following propositions are stated:

- H1: The judge staff is a cause of delay in the flow of cases throughout the court process;
- H2: The judge is a cause of delay in the flow of cases throughout the court process;
- H3: The lack of information systems is a cause of delays in the flow of cases throughout the court process;
- H4: The lack of available rooms is a cause of delay in the flow of cases throughout the court process;
- H5: The parties involved in the case (author and accused) are a cause of delay in the flow of cases throughout the court process.

Taking into consideration the structure of the legal system, with several courts of law but without allowing the parties to choose the court to which the legal case will be submitted, and the internal organization of the several courts, with different departments functioning independently to each other, a second group of hypothesis is suggested. These are focussed on the analysis of the influence of the performance of the courts and departments on the period of time it takes for a case to achieve a final decision.

- H6: The court to which the case is submitted has no influence in the period of time required to give a case a final decision;
- H7: The department to which the case is submitted to has no influence in the period of time required to give a case a final decision.

3 Research Methodology

The methodology is based on case study analysis due to the fact that logistics research is still in an early stage in this area (Eisenhardt, 1989). Taking into account the nature of the research, extra emphasis will be given to the framework of analysis (Yin, 1981; Strauss *et all*, 1990, referred by Ellram, 1996). As the research involves two case studies, emphasis will be given to cross-case analysis while only a brief summary of the individual cases is provided (Yin, 1981). This research methodology was adopted since a holistic and flexible research design was needed (Hakim, 1987) to deal with variety and complexity of the data (Hartley, 1994; Yin, 1989). The case studies are "instrumental cases" (Stake, 1989) as they are of secondary interest, and are only used to give understanding to more general issues.

The research has a "decision-oriented approach" (Vafidis, 2002) as it emerges from a set of empirical evidence collected from two case studies (two Courts of First Instance). These have a total of six departments. This research aims at finding patterns from the comparison of these case studies, so that areas and actions for improvement may be defined, and validity of results is expanded (Ellram, 1996).

Evidence consists on a random and representative sample (Ross, 2005) of 299 civil summary cases submitted to these courts between 1997 and 2002; 165 cases from case study 1 and 134 cases from case study 2. Case study 1 has four departments and case study 2 two departments. The quantitative data was enriched with qualitative data collected from observation (Yin, 1981).

Courts and departments are independent variables. The 28 dependent variables are the activities/sequence of steps a case has to go through to reach a final decision. This sequence of steps describes the court process (Mesquita, 2002). To these initial variables four more dependent ones were added to highlight the total period of time per legal subset of activities (discussion, definition and judgement). The data collected identifies the number of days each case remained in each activity and subset of activities.

Two level of analysis were performed. The first one on the total period of time each case spends at each step. Here the variables were tested to identify the activities with higher levels of demand. The second level of analysis is performed on the delays each case registers in each activity. These delays were identified by comparing the legal limit with the real number of days. Here delays were analysed to identify those activities that show higher percentage of delay above its maximum legal duration. At both levels variables were tested for different patterns of behaviour according to each independent variable.

Both parametric and non-parametic tests were performed (Maroco, 2003) as most variables did not confirm normal distribution even after transformation (Hill *et al.*, 2002). Wilcoxon-Mann-Whitney tests (Conover, 1980) and T-tests (Ross, 2005) were used to identify differences of behaviour in the two courts of law. Kruskal-Wallis test (Conover, 1980) and One-way Anova (Ross, 2005) were used to show differences between the six analysed departments. Post hoc tests, mainly Tukey HSD, were performed to explore the origin of the identified differences.

The Pareto Rule was applied to identify the most demanded and delayed activities.

4 Case Study Findings

This chapter aims at highlighting the findings in terms of activity classification and the similarities between courts and departments, when the total period of time a case spends in each activity and the delay it experiences are compared.

4.1 Classification of Activities

The types of interference/resource each activity depends on were used to identify the type of bottleneck. These resources were identified as "Staff", if the activity depends on the staff that is supporting the judge; as "Judge", if the activity depends on a decision or input from the judge; as "Parties", if the duration of the activity depends on input from one of the parties involved, author or accused; as "Equipment", if the number of days on the activity depends on the availability of a specific equipment to be used; as "Information System", if the length of the activity depends on information from outside data bases. This classification is highlighted in figure 1 and referred as the type of bottleneck that may emerge if, in fact, that activity is restraining the flow.

The number of days the judge staff has to wait to receive good quality information from government departments on the location of the accused was eliminated, as this activity is not included in the process defined by the law, showed too few observations and statistic tests could not be computed. This way no activities were classified as "Information System".

Although the process has a predefined sequence of activities, it is possible that, due to the nature of the case, to a decision from the judge or to absence of input data from the parties, some of those activities do not have to be performed and the case passes directly to the following activity. Activities with the higher level of demand were identified through the application of the Pareto Rule. Activities classified as "A" are shown in dark grey in Figure 1 and activities classified as "B" are shown in light grey. It was found that at least 82.3% of the analysed cases pass through "A" activities, and that activities classified as "B" serve at least 23.4% of the cases. Activities classified as "C" are shown in white and no more than 17,1% pass through each one of them. In fact 18.5 % of the activities (5 over 27) verified no cases went through them.

The steps that show the higher level of delays were also identified. The median of delays was compared to the legal maximum and the percentage of delay was identified. A Pareto Rule was also used to identify the

activities with the highest delay. Activities with delays of 450% or more above the legal maximum (6 over 27 activities) were classified as "A". These activities are shown if Figure 1 written in bold.

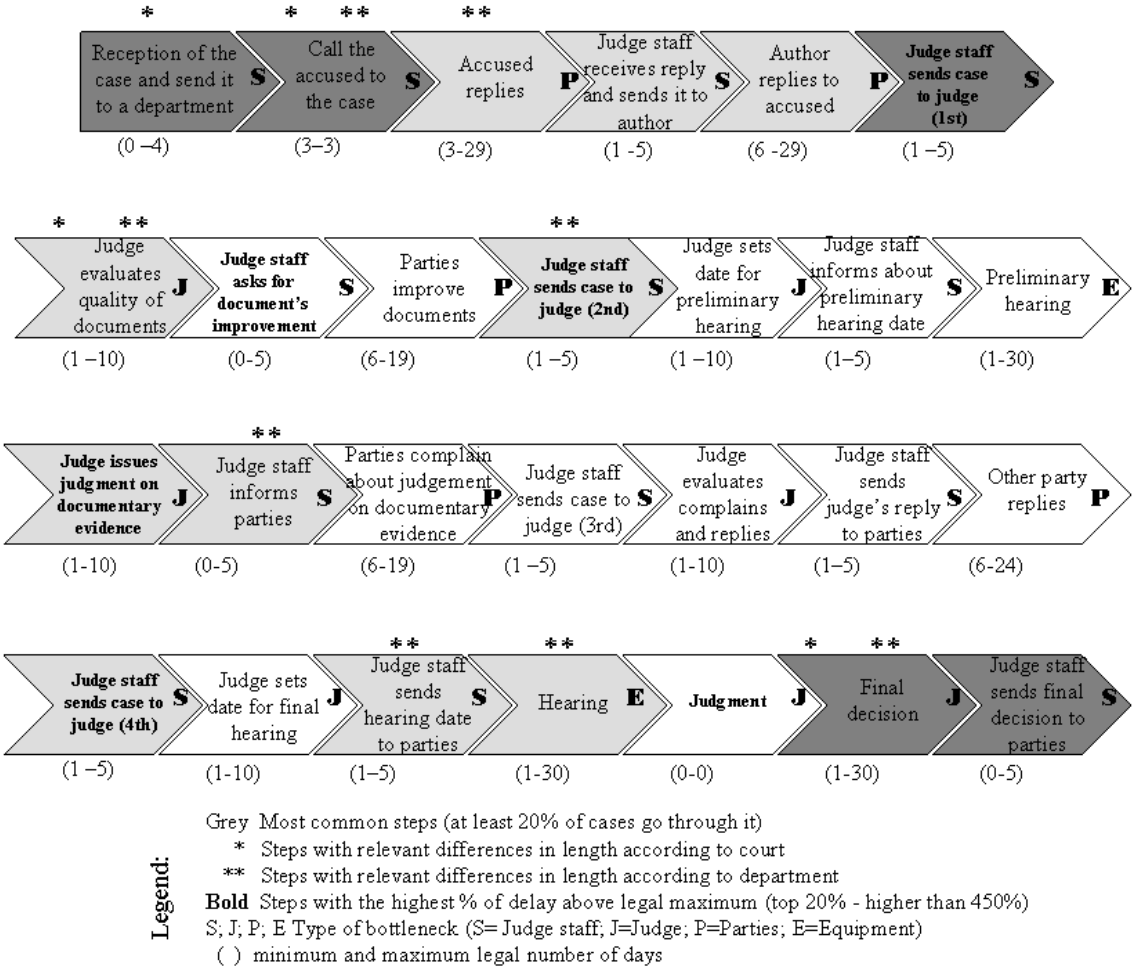

Figure 1 - Classification of activities

4.2 Findings From the Total Period in Each Activity

When comparing the period of time each court requires to perform each activity, some differences were found. The significant differences are shown in Table 1 and highlighted in Figure 1.

Dependent variables found significant	Reception of a case and send it to a department	Call accused to the case	Judge evaluates quality of documents	Judge staff asks for document improvement	Judge staff sends case to judge (2nd)	Judge staff sends case to judge (3rd)	Judge staff send hearing date to parties	Final decision
Significance level	0,056 **	0,003 *	0,050 **	0,073 **	0,035 *	0,042 *	0,030 *	0,001 *
Test	Mann-Whitney	Mann-Whitney	Mann-Whitney	Mann-Whitney	Mann-Whitney	T-test	Mann-Whitney	Mann-Whitney

* - significant at level 0.05; ** - significant at level 0.08

Table 1 - Comparison of total number of days in each activity: independent variable = Court

From the findings in the previous table it is possible to affirm that the Staff and the Judge are a cause of differences between court behaviour in the different activities, which does not contribute to confirm H6.

When comparing the total period of time each department required to perform each activity, significant differences were also found. These are shown on Table 2 and identified in Figure 1.

Dependent variables found significant	Call accused to the case	Accused replies	Judge evaluates quality of documents	Judge staff sends case to judge (2nd)	Judge staff informs parties (about judgement on doc evidence)	Judge staff send hearing date to parties	Hearing	Final decision
Significance level	0,056 **	0,024 *	0,011 *	0,063 **	0,036 *	0,019 *	0,000 *	0,002 *
Test	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis

* - significant at level 0.05; ** - significant at level 0.08

Table 2 - Comparison of total n. of days in each activity: independent variable = Department

Post hoc tests (Tukey HSD) showed that there are no relevant differences between judge staff in terms of calling the accused to the case, although department 3 and department 4 show an average of 34 and 35 days each and department 5 shows only 14 days of average; significant differences were found (for $\alpha=0.08$) when sending the case to the judge for the second time between department 1 and departments 5 and 6 ($\rho=0.078$ and $\rho=0.055$) with means of 203 days against 41 and 41 days respectively; significant differences were also identified in the activity in which judge staff informs parties about judgement on documentary evidence, between department 3 and departments 1 and 2 ($\rho=0.037$ and $\rho=0.028$) with means of 38 days against 4 and 5 days respectively; showed no significant differences for judge staff sending hearing date to parties although department 6 shows an average of 60 days against 5 from department 1. In terms of differences between judges, post hoc tests identified significant differences in judges, when evaluating document quality between department 1 and all others except number 4 ($\rho=0.024$, $\rho=0.019$; $\rho=0.010$ and $\rho=0.008$ respectively) with means of 110 days against 1 from department 3; significant differences were also found when issuing the final decision between judge from department 1 and from department 6 ($\rho=0.027$) with means of 109 days against 26 days, respectively. Post hoc test also found significant differences in terms of accused replying ($\rho=0.014$) between department 4 and 5, with means of 50 and 36 days respectively. Finally, in terms of hearing, post hoc tests found significant differences between department 2 and departments 4 and 6 ($\rho=0.001$ and $\rho=0.023$), and between department 4 and department 1 ($\rho=0.030$).

These significant differences between the different departments does contribute to confirm H7.

In terms of department behaviour it is possible to affirm that (1) although there are different causes for the differences, these emerge mainly from the way the Staff is performing their tasks; (2) setting a date for an hearing and issuing the final sentence are also significantly different, which shows that Judge behaviour influences the duration of the case in those activities; (3) all departments except one accept replies beyond the legal limit, mainly number 4; (4) departments 5 and 6 (the two from case study 2) have similar behaviour, but the remaining four (from case study 1) do not show similar pattern.

4.3 Findings From the Delays in Each Activity

In terms of the number of days of delay in each activity, the courts show some significant differences. These are shown in Table 3.

Dependent variables found significant	Judge staff sends case to judge (2nd)	Judge staff informs parties (about judgement on doc evidence)	Judge staff sends case to judge (3rd)	Hearing	Total period of time in discussion	Total period of time in definition	Total period of time in court
Significance level	0,075 **	0,004 *	0,014*	0,046 *	0,078 **	0,056 **	0,051 **
Test	Mann-Whitney	Mann-Whitney	T-test	T-test	T-test	T-test	Mann-Whitney

* - significant at level 0.05; ** - significant at level 0.08

Table 3 - Comparison of n. of days of delay in each activity: independent variable = Court

The delays in the cases, when the courts are compared, are centred in the judge staff as well as in the availability of rooms in where to schedule the hearing. The total period of time each case remains in the main subsets of activities is also different, as well as in the total process.

When comparing the departments in terms of the number of delayed days in each activity significant differences emerge. These differences are shown in Table 4.

Dependent variables found significant	Call accused to the case	Judge staff receives reply and sends it to author	Judge evaluates quality of documents	Judge staff asks for document's improvement	Jude staff send case to judge (4th)	Hearing	Total period of time in discussion	Total period of time in court
Significance level	0,000 *	0,070 **	0,072 **	0,009 *	0,066 **	0,000 *	0,049 *	0,066 **
Test	Kruskal-Wallis	Kruskal-Wallis	Kruskal-Wallis	One way Anova	One way Anova	One way Anova	One way Anova	Kruskal-Wallis

* - significant at level 0.05; ** - significant at level 0.08

Table 4 - Comparison of number of days of delay in each activity: independent variable = Department

Post hoc Tukey HSD tests showed relevant differences between departments for judge staff in terms of calling the accused to the case (for α=0.1) between departments 3 and 5 (ρ=0.097) with means of 44 days against 15 days; no relevant differences in terms of receiving the reply and sending it to the author, although the average number of days for department 1 and 5 is of 75 days each against 6 days from department 5; no relevant differences were found between staff departments when asking for document's quality improvement; and no relevant differences between departments when sending the case to the judge for the fourth time. In terms of judge performance, post hoc tests showed relevant differences between departments 2 and 4 when the judge evaluates the quality of the documents (ρ=0.050) with means of 10 and 243 days respectively. When analysing activities that depend on equipment/space availability significant differences in post hoc tests were found between departments 1 and all the other departments except number 2 (ρ=0.032, ρ=0.003, ρ=0.009 and ρ=0.021) when scheduling the hearing and between department 2 and all the others except number 1 (ρ=0.004, ρ=0.000, ρ=0.001 and ρ=0.001), with departments 1 and 2 showing smaller number of days of delay.

Taking into account that departments 1 and 2 share the same court room, that there is another room that is shared between departments 3 and 4, and that departments 5 and 6 share the unique room in their court, departments 1 and 2 are identified as having a better use of their court room.

5 Results

From previous findings it was possible to identify why cases tend to stall during the process and hints to how to overcome those motives.

5.1 Walls in Process Flow

From the previous findings it is possible to affirm that:

- The most used activities and the ones where the cases tend to experience larger delays are mainly dependent on the judge staff, and these are also the ones where most significant differences between courts and departments occur showing that human resources management can lead to major differences in terms of the total duration of cases throughout the process;
- The four departments from case study 1 show less similarity between them than the two departments from case study 2. The way the departments are globally managed has direct impact on department performance but no variables were available to access this consideration;
- Judge staff emerges as the most frequent constraint in the process. It is more relevant in terms of those activities that involve sending the case to the judge. Nevertheless, it should also be taken into account the fact that the judges themselves informally ask their staff to delay some cases to a specific date in the future (usually the more time consuming cases are delayed to the vacation period). This way some delays that emerge as results of judge staff underperformance are in fact caused by the judge;
- Delays attributed to parties, mainly in the reception of complaints, occur equally in both case studies. This finding shows a tendency from the department's staff to accept delays from the parties (with direct negative impact on the total period of time the case will take to reach a final decision, and also on the value created to the other party). There are also different levels of permissiveness, which contradicts the principle of equity in justice in the several departments and courts;
- Differences in setting hearings and issuing final decisions show that the way the judge schedules his/hers own work is not always in a way that will lead to shorter global delays;
- The period of time a case will take to achieve a final decision depends on the court where it is submitted to and the department to which it is internally distributed to;
- Judge's staff tends to show significant differences in processing cases when sending documents to parties. Taking into account that tasks to be performed only involve printing a document that is automatically generated by the computer system and copying the document produced by the judge, activity scheduling and productivity (also motivation) may be found as reason for those delays.

5.2 How to Break the Bricks

The constraints in the court system are not only those that emerge from the structure of the process itself, but also the ones that result from the way activities are scheduled and resources are involved and motivated. Generating more value to customers requires actions/changes in the structure of the process, but also in the way the human resources that work in it are motivated and educated.

Lead times in the court system could therefore be improved if the system is able to overcome its constraints. Actions to be taken into practice could start with:

- Increasing staff competence on the scheduling of activities;
- Increasing staff competence on using the available computer system;
- Increasing, highlighting and recognizing judge's staff and judge motivation and their importance to value creation;

- Increasing judge competence on the scheduling of activities;
- Changing the way judges are evaluated - they are evaluated based only on the number of cases they reply to instead of considering also the level of complexity of the case;
- Improving the way of using court room availability and learn from best practices;
- Improving the competence of the president of the court, as significant differences occur between the case studies (learn from best practices);
- Not allowing reception of documents from parties after legal limits are reached. This may be used to delay the case (and if it is not on purpose it should get previous acceptance from the court);
- Sending cases from department staff to the judge according, for instance, to the number of days it is already waiting to receive a reply, and not arbitrarily decided by the department staff leader;
- Identifying best practices and share them with other departments and/or courts.

6 Conclusion

The preceding chapters have demonstrated, through literature revision and case study analysis, that it is possible to approach the court system from a logistical perspective, making its products flow in the system in a way that will generate more value to the final consumer. It is possible to reduce time in the system.

It was found that the court system analysed is not creating value as it takes longer than expected to produce results and, as a consequence, the costs for the system are higher than they should be (Chase *et al*, 2007).

It was possible to confirm H1, H2 and H5, which is to say that the judge staff, the judge and the parties are in fact restraining the flow of cases with their behaviour. It was not possible to evaluate H3 due to absence of dependent variables.

H4 was not confirmed as it was not the lack of court rooms that was identified as restraining the flow, but instead the way the room's availability is scheduled. Court rooms are therefore a bottleneck that once poorly managed can turn into a constraint.

Finally, H6 and H7 were not confirmed. In fact, the opposite of these hypotheses was shown, as significant differences were found in terms of comparison of the total period of time of delay, both between courts and in terms of departments.

Efforts to reduce the period of time the cases remain in the court system before getting a final decision should be focussed on increasing competences of judge staff and the judge him/herself; learn from best practices and good niches of performance; increase staff and judge sensibility to value creation.

Although the conclusions are supported on quantitative data analysis and adjusted with qualitative data collected from observation, this research only considers two courts of law. According to Yin (1981) the low number of case studies in this situation does not prevent us from being able to generalise theoretical propositions. The methodology that was followed assures that these propositions are likely to be empirically valid (Eisenhardt, 1989). In fact, according to Ellram (1996), the purpose of this analysis is to generalise theories.

This research is limited to one specific type of case, summary case, and does not evaluate the relation between independent variables. It would be interesting that, in the future, different cases with similar processes could be added to analysis allowing the complexity of the cases to be analysed as an independent variable.

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