AMERICAN UNIVERSITY OF BEIRUT

PROCESS REENGINEERING OF SPEEDING TICKETING SYSTEM

by
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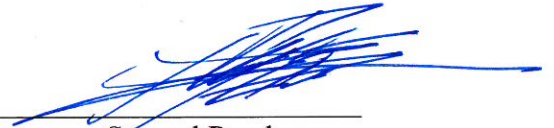## PROCESS REENGINEERING OF SPEEDING TICKETING SYSTEM

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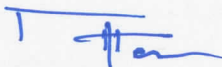Student Name: AL ALAM Maher Atef
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ACKNOWLEDGMENTS

AN ABSTRACT OF THE PROJECT OF

Maher Al Alam   for   Master of Business Administration
<u>Major</u>: Business Administration

Title: Process Reengineering of Speeding Ticketing System.

In order to evaluate the current speeding ticketing processing system, personal interviews were conducted with the process stakeholders from the various Traffic Detachments, Traffic Court, LibanPost and OMT. Data was sourced during these meetings. Other historical data presented in the study was sourced online from the ISF website. These figures were used for descriptive analytics in support of trends and patterns of the process flow. They were also used to estimate the financial shortfall from the present process. The assessment of speeding fines' impact on drivers relied on a recent study that used CEES-IMEET projects to evaluate e-government services, specifically including speeding fines.

The risks and problems linked to the current processing system that were identified are: Improper and insecure Data storage, variability in processing capacities and Time for the 16 Traffic Detachments working independently, risk of Data loss,   predictable input of flashed speeding cars, manual processing of speeding tickets, risk of favors and unethical behavior, risk of losing tickets and/or damage to paper, lengthy Lead Times to notification of Contraveners, lengthy Time-to-upload and Time-to-cancel from the ISF Radar webpage, double SMS notification by LibanPost and OMT, limited methods of payment (OMT, LibanPost, and in-person at the Traffic Detachment) and Money Stamps as the only acceptable payment proof, delivery-to-address time by LibanPost, Time-to-transfer tickets (White Tickets) to Traffic Courts, Traffic Court processing capacity of unpaid tickets and objections, Time-to-Notify Contravener by local Police stations, indirect cost of physical presence and time at Traffic Court to settle fine.

The recommended re-designed process was based on the following guidelines: Centralized processing center for speeding tickets, speeding ticketing server linked to all concerned organizations and institutions, introduction of new payment methods and printable e-tickets from the re-designed website. The estimated cost of this plan is 200,000$ with yearly operational costs of 50,000$; which is less than the actual financial shortfall at the Baabda Traffic Detachment estimated at 287,000$ if only 50% of the yet unprocessed tickets were collected.

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CHAPTER I

INTRODUCTION

The Speeding Photo Radar at the Internal Security Forces (ISF) institution should play a crucial role in traffic safety. It aims to change speeding behavior and to reduce speeding-related crashes. Ironically, getting the speeding ticket takes a long time. The issuance of speeding tickets involves the interaction of many stakeholders including, but not limited to, Traffic Detachments (مفارز السير), IT Section at ISF commandment (شعبة المعلوماتية), LibanPost, OMT, Traffic courts (محاكم السير) and local police stations (مخافر الدرك). Most of the actions are manually performed and, in some cases, it can take years before a lost speeding ticket finds its way to the faulty driver. While there is no question that camera-based speeding radars can generate revenues, a lengthy and manual processing system can also incur losses and have no deterrent effect on speeding drivers. The system is then perceived as insignificant for road safety; thus generating dismay among drivers and loosing public support for Radar Speeding Enforcement.

The goal of this study is to re-design the speeding ticketing process as a shared-value model for all stakeholders. The specific objectives are to (1) evaluate the existing process, (2) determine its economic impact, (3) assess whether the current process has any impact on drivers' speeding behaviors, and (4) propose a re-designed process based on the research findings.

This study used the Cognitive Analytics Management (CAM) as a framework to realize its goal. The shared-value model identified speed reduction as a social

objective to all involved stakeholders. The framework helps to integrate performance measurement with strategic management, and develop Key Performance Indicators (KPIs') applicable to both current and re-designed system.

Consultation with the various involved stakeholders was undertaken to evaluate the current processing system. The consultation took the form of personal interviews with the concerned people from the various Traffic Detachments, Traffic Court, LibanPost and OMT. Data was sourced during these meetings. Other historical data presented in the study can be found online at the ISF website. These figures were used for descriptive analytics in support of trends and patterns of the process flow. They were also used to estimate the financial shortfall from the present process. Finally, the assessment of speeding fines' impact on drivers relied on a recent study that used COBRA framework to evaluate e-government services, specifically speeding fines.

Although speeding radar has been used in Lebanon for more than 15 years, many questions remain to be answered about its effective application; this includes the full implementation of the 2012 driving law, providing means to improve and expand the program, and maintaining public support. The greatest impact on traffic safety can only come from mutually coordinated actions.

CHAPTER II

BACKGROUND

Exceeding the speed limits is among the top ranked potential reasons of traffic crashes (Abdalla, 2002). Speed is also a major contributory factor to the severity of a crash (Roads and Traffic Authority of New South Wales, 2011). The probability of death from an impact of 80 km/hr. is 15 times the probability of death from an impact speed of 40 km/hr. (Joksch, 1993). In 2016, Speeding was a causal factor in 724 out of 3647 crashes registered by the Internal Security Forces (Internal Security Forces, 2017), while not respecting speed limits was recorded in 320 of these cases (Kunhadi, 2017). Speeding related crashes are in decline since they peaked at 43% of total crashes in 2013. However, it should be noted that Lebanon doesn't have a national observatory for data. Therefore, the validity of the statistics related to traffic crashes, which are issued by the ISF, is questionable and biased data might be included.

A. Automated Speeding Enforcement

Different strategies are used to combat speeding. Currently, the stationary vehicle-mounted speeding photo radar is the only automated approach used in Lebanon. Several studies from different countries have concluded that the use of speeding radar was indeed effective in reducing excessive speeds (Kang, 2002) (Goldenbeld, 2006) (Rahim F. Benekohal, 2010), crashes and fatalities. However, despite the effectiveness of speed cameras in developed countries as well as in some Gulf countries (UAE),

camera-based speed enforcement has opponents, which view these programs more as revenue generators more than traffic safety controllers (Lopez & Maccarrone, 2015).

1. *Automated Speeding Enforcement in Lebanon*

Automated enforcement technology is recently used in Lebanon to supplement traditional traffic enforcement methods. The Traffic Management Center was launched in 2008. It links and controls all traffic lights in the capital and its suburbs. But it can also provide Traffic Detachments with information about contraveners to issue violation tickets, although not systematically. The center also uses social media channels to update road users. Although, speed cameras were the first form of automated enforcement technology in the world, red light cameras are the most widely used form of camera-based enforcement in the USA (Miller, 2016). Red lights cameras are not used in Lebanon.

The Lebanese speed photo radar program started in May 2008 (Doueihy, 2008). Since that date, the national center for data processing has yet to become a reality. The number of radars is 15 and they are distributed on 16 Traffic Detachments (Figure 1). The number of radars is still the same since 2010. It should always be positioned to catch speeding cars from tail, in respect of citizens' privacy. It is interesting to note that the Beqaa governorate is covered only by two speeding radars.

مفارز السير في لبنان

مفرزة سير حلبا	مفرزة سير بيروت الأولى
مفرزة سير زحلة	مفرزة سير بيروت الثانية
مفرزة سير زغرتا	مفرزة سير بيروت الثالثة
مفرزة سير صور	مفرزة سير الجديدة
مفرزة سير صيدا	مفرزة سير الضاحية
مفرزة سير طرابلس	مفرزة سير النبطية
مفرزة سير اميون	مفرزة سير بعبدا
مفرزة سير المطار*	مفرزة سير بعلبك
مفرزة سير الوسط*	مفرزة سير جونية

Figure 1: Traffic Detachments in Lebanon. Two Traffic Detachments operate without speeding radars; which are the Airport and the Beirut Downtown Traffic Detachments.

In the fall of 2010, a strong campaign against speeding was launched, with coordinated actions between the Ministry of Interior and Road Safety Awareness Associations. The campaign lasted for more than three months with media coverage. The result was a reduction in traffic crashes and victims of 30-40% (Annahar Newspaper, 2014) and a record 2243 speeding fines issued on the 29th of October 2010, according to the ISF public statements. This campaign proved efficient and demonstrated that the decrease in speeding and speeding related crashes can be achieved through coordinated actions. The Ministry of Interior also made the first changes to processing speeding fines during this campaign. When the radar program started, a road block had to be set up upstream to stop and fine violators. However, this process changed. Road blocks were removed. Speeding tickets would be filled daily in traffic Detachments and uploaded to the ISF website, where people would enter their plate number to check if they were caught speeding by the radar. The notification and collection process would be outsourced to LibanPost. The process has incurred no changes or improvements since that time.

In a recent public statement issued by the ISF and dated 27 April 2017, it announced that the number of road crashes and victims has declined 20% over two consecutive years from April 2015, the date of application of the new road law, compared to the two years prior to that date[1] (Internal Security Forces, 2017). Despite the numbers, speeding radars are controversial and are often portrayed as being unpopular by the news media, especially the poor processing system of speed tickets (Annahar Newspaper, 2014) (Nazzal, 2010) (Iklimos, 2016). In some cases, people can have fines appear on the ISF speeding radar page from years ago without having received their tickets (Figure 2).

Figure 2: A speeding driver's record on the Radar webpage. Although it shows that the driver was fined twice in 2011 and 2012, he has never received notifications about these tickets nor has he received them at his address or was he notified to show in Court.

Lebanon shares these issues with the rest of the world (Lopez & Maccarrone, 2015). The controversial themes include fine revenues, fairness of ticketing, speed limits being perceived as too low, privacy and legitimacy. A well-designed ticketing system to fight speeding can garner public support, while poorly implemented programs generate negative media and public reactions.

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[1] The validity of these figures is questioned by the National Road Safety Council.

2. Speeding Behaviors and Other Facts

"Speeding" refers to instances when vehicles travel in excess of legally declared speed limits or any inappropriate speeding on roads. People admit to enjoying driving fast on the roads, which reflect widespread tolerance of speeding as an acceptable social behavior (Kang, 2002). In a study published last year in the USA, the NHTSA identified five types of speeding and four types of speeding drivers (NHTSA, 2016). The five types of speeding behaviors were:

- Speeding at speed zone transitions.

- Incidental speeding, which was the most common type of speeding.

- Casual speeding, similar to incidental speeding but involving higher speeds and drivers aware to be speeding.

- Cruising speeding, happening mostly on highways for a long duration.

- Aggressive speeding, high level of speed variability for a moderate duration.

The four types of speeding drivers revealed were:

- Deliberate speeders, which have frequent risky driving behavior.

- Typical speeders, which have more common with casual speeding.

- Situational speeders, which are a speeding-up type of drivers.

- Unintentional speeders, which have an attitude toward not speeding but still engage with incidental speeding.

Most of the speeding drivers have been fined for exceeding the limits. However, in a European study on traffic enforcement (Mäkinen & Zaidel, 2003), it was estimated that just a very tiny fraction of speeding vehicles is issued citations in the area of speeding. At any given time, from 15% to over 50% of vehicles in EU traffic were

travelling at least 15 km over the posted speed limit. Only fixed speed camera radars have shown to have a permanent impact on speeds, and again, only in the immediate vicinity of a surveillance installation.

Changing speeding behaviors may have large benefits in terms of reducing speeding-related crashes (Observatoire des vitesses de l'ONISR, 2015). Legal speed limits set a general context for traffic speed, but within the difficult Lebanese context of reduced number of radars, specialized police forces dedicated to speeding, and poor processing ticketing system, compliance may be low and speed enforcement might not have any substantial impact.

3. "Speeding" in the Traffic Law of 2012

The new Lebanese Traffic Law was approved by the Parliament on the 22nd of October, in 2012 (Traffic Act, 2012). However, it only went partially into effect on the 22nd of April, 2015. The major projects and updates stipulated by the Law that have been undertaken are:

- The creation of the National Road Safety Council (Article 356).

- The creation of the National Road Safety Committee (Article 359).

- The redefinition of the Traffic Rulings Enactment Bureau role, مكتب تنفيذ احكام السير (Article 369).

- An updated categorization of road offences (Chapter 2 of Part XI).

- The penalization of speed radar detectors (Article 385).

- The distribution of revenues: Refer to Chapter 3 Sections related to the "Evaluations" of the 2nd and 3rd phase to see the beneficiaries and shares from the speeding radar fines monetary revenues (Article 401).

It is important to note that the Traffic Rulings Enactment Bureau (مكتب تنفيذ احكام السير) doesn't handle speeding tickets rulings and doesn't signal them to the online car registrations system to place restrictions, as stipulated in Article 371[2]. The reason that it isn't fully operational yet, is due to its current capacity (human resources) and to the fact that the server linking all administrations concerned with traffic safety and management has not yet been established (Figure 3). Other key on-going projects that have yet to become operational are:

- The creation of the automated driver's Traffic Profile (Article 364).

- The creation of a driver's license credited with 12 points (Article 365).

- The conception of a Lebanese Driving Education Curriculum.

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[2] The Traffic Law defines the role of مكتب تنفيذ احكام السير as following:
على مكتب تنفيذ أحكام السير، وضع إشارة على ملف المركبة المخالفة في قاعدة المعلومات لدى ا دارة المختصة، حيث يتوقف إنجاز المعاملات الخاصة بهيئة ادارة السير والاليات والمركبات وفروعها، والمعاملات المتعلقة بدفع رسوم السير السنوية التي تجري خارج مراكز الادارة المختصة وفروعها في المحافظات، على ثبوت خلو الملف الخاص بالمركبة من أي أحكام مخالفة لقانون السير صادرة بحقه، وتسديد ما يتوجب عليه ازالة الإشارة.
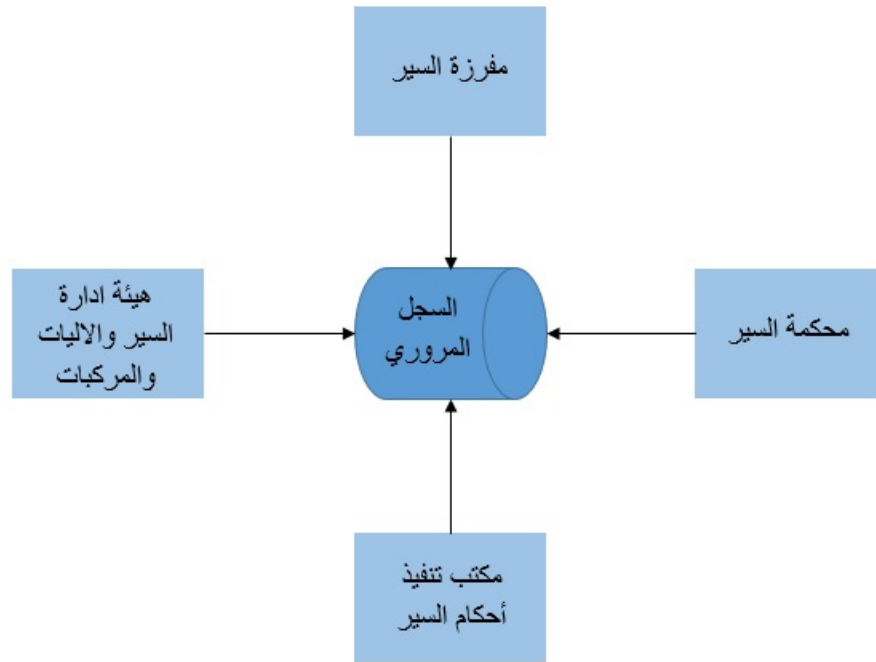
Figure 3: Online Traffic Record; the law stipulates that every driver should have a Traffic Record and a driver's license credited with 12 points. The Traffic Record must have a shared database between the concerned stakeholders.

The definition of "Speeding" is found in the first Part, under Chapter 3. The new speed limits were set in Article 26, as following:

- 100km/hr. on Highways

- 70 km/hr. on National roads

- 50 km/hr. in populated areas

The new Road Offences Schedule linked each violation to an article of Law and split into five types. Fine amounts also increased from the previous law. The amounts gradually increased from a "type 2" traffic violation to a more serious "type 3" violation, up to a "type 5" violation (Figure 4) which means that the car and driving license should be seized and the contravention should be settled directly in court.

المادة 24 و 26   :في حال توقيف السائق

قيمة الغرامة حسب المادة ٣٧٤

فئة	المخالفة	القيمة
٢	السير دون السرعة المعمول بها	200,000 - 300,000 LBP
	تجاوز السرعة المحددة بأقل من 20 كلم/س	
٣	تجاوز السرعة المحددة بين 20 كلم/س و 40 كلم/س	350,000 - 450,000 LBP
٤	تجاوز السرعة المحددة بين 40 كلم/س و 60 كلم/س	500,000 - 700,000 LBP

المادة ٣٧٧:محاضر ذات الطابع أو الغرامات

مهلة ٣٠ يوم للدفع من تاريخ تبلغ المخالف بالبريد

قيمة الغرامات المخفضة:

فئة	أول ١٥ يوم	ثاني ١٥ يوم
٢	100,000 LBP	150,000 LBP
٣	200,000 LBP	350,000 LBP
٤	350,000 LBP	450,000 LBP

فئة	المخالفة والعقوبة
٥	تجاوز السرعة المحددة بأكثر من 60 كلم/س
	حجز السيارة ومحاكمة جزائية
	مع تغريم من ١٠٠٠،٠٠٠ إلى ٣٠٠٠،٠٠٠ ليرة
	حبس من شهر إلى سنتين إذا إقتضى الأمر

تقديم الاعتراض على المحضر في مدة ثلاثين يوم في المحكمة أو البريد المضمون ويصار الى علنية وفقا لأصول المحاكمة العادية.

Figure 4: Type of fines and the monetary values of the penalties as stipulated in the Traffic Law of 2012.

In conclusion, the public administration stalls when it comes to projects that require Information Technology expertise and setting up automated systems, which is the case for creating a Traffic Profile database, an automated speeding ticketing system to improve the current lengthy process, and linking administrations concerned with traffic safety and management together. All these actions are directed for the public good and are able to help improve road safety.

B. Improving a Speeding Ticketing System

Managing in the Public sector is much harder than leading private organizations; even though, People perceive working in the public administration as more rewarding morally and as serving in the interest of citizens. Individuals are even willing to take a lesser pay when applying for governments' institutions (Halachmi & Bovaird, 1997). Most of the time, these institutions are full of bureaucracy and in need of innovation and revamping. Political decision making systems and debt-crippled budgets make it even harder to change the existing systems. While awaiting major political decisions to re-structure or outsource processes, institutions opt for system improvements which can be decided at the lower management levels and done at a low-cost.

1. New Public Management Concept

In recent years, governments of industrialized countries implemented actions to change the way they run their services and productions, and how they relate to citizens. Their efforts were based on paradigms from the private sector organizations (Halachmi & Bovaird, 1997) who had successfully applied Business Process Reengineering (BPR). Scholars jumped on these efforts to study and conceptualize them (Fragoso, 2015), and built a model known as the New Public Management (NPM). The main components of this model are known as the "5R's": Restructuration, Process Reengineering, Reinvention, Realignment and Reconceptualization. This model pressures for administrative efficiency, good governance, accountability and e-Government services. However, there is still no evidence of this generic model effect on organizations' performance in developing countries (Kassahun, 2012). Hence, management tools,

when imported from developed countries, should be adjusted to the reality of the context.

2. *Best Practice*

The overall improvement of the public network of services refines countries' images. It brings accessibility to citizens while helping states in delivering messages and reaching their goals. Safety is always a shared concern between citizens and public institutions. Public awareness and opinions are drivers of public policies. Developed countries are quick to adopt technological enhancements to matters concerning public safety. Technological companies were quick to offer IT solutions and services in this field. Speeding ticketing processes in France and the United Arab Emirates (UAE) are presented in this part as Best Practice examples. The reasons for choosing these two countries are that Lebanon and France are closely linked culturally, economically and at States level, while the UAE are best in the region in Traffic Safety technologies.

a. France and the ANTAI agency

France started to automate traffic offences processing in 2004 by putting in place pilot projects under public ministerial supervision (ANTAI, 2017). After several years of cumulating experience, the result was the creation of the National Agency for Automated Data Treatment, known as ANTAI. For speeding cameras, the automated processing is composed of all steps from flashing violators to issuing tickets automatically by an officer and mailing of the speeding ticket. This process is carried out in ANTAI's national processing center, in Rennes. The main innovative points in processing speeding tickets in France are:

- Speeding fines can be appealed online and reviewed by the agency if the driver wishes to, which saves time and costs of appealing in courts.

- Drivers can pay their fines using a mobile application or pay at the tobacconists.

- Vehicle owners can signal their change of address online using "Consult your file" webpage, a feature which also helps them track their fines processing progress.

- Violators have up to 46 days to pay their fines. The e-ticket can now be paid and printed online replacing the stamp-fine tickets. However, the fines are still sent to Contraveners address by the mail company.

- Exchange of information between state members of the European Union helps track violators of other state members, which have 90 days to pay their fines. If not settled, fines are transferred to local authorities to handle payments. The website and the appeal forms are available in 5 languages other than French.

Automated Speeding Enforcement in France includes the following types of speed radars: fixed speed camera, mobile speed camera, distinguishing fixed speed camera to help distinguish several closely speeding cars, "average speed" camera which control drivers over several kilometers and informative speeding camera which is not meant to punish drivers but rather to inform them. One controversial used type of radar is the "mobile-mobile" speed camera. This radar is installed in civilian unmarked patrol cars which can control vehicles at any time and any place. This type of control is very unpopular and denigrated by several associations (Figaro, 2017).

According to Traffic Safety figures in France, fatal crashes are down 66% in vicinity of speed radars since they were installed, some twelve years ago. Speed radars have also reduced the average speed on French roads by 10km/hr., which has an enormous effect in terms of life saving (ANTAI, 2017).

b. Speeding offence system in Dubai and the UAE

Fixed speed radars in Dubai are part of the city's landscape. They are found in every street and are of various types. Be it in Dubai, Abu Dhabi or Sharjah, the country's number of fatalities from crashes significantly decreased from 29 (per 100,000 population) in 2005 to 10.9 in 2013 (World Health Organization, 2016). The country invested heavily in radar speeding enforcement and the different Emirates operate all types of radar that we have listed above for France. One efficient segment of speeding enforcement is the existence of 500 friendly radars in Dubai to tell you to slow down when the driver is about to exceed the speed limit (Figure 5). The ultimate goal is road safety and not monetary.

Figure 5: A speeding notification from the Dubai Police, intended to inform the driver that he was caught speeding and that this message is for Traffic Safety rather than monetary punishment.

However, speed radars enforcement speeds are 10 to 20 km/hr. above the posted speeds in the UAE. In a recent speeding case study in Dubai, the average speed measured on a roadway was still higher than the posted limit, but less than the radar limit (Abdelfatah, 2015).

On the other end of speeding enforcement is processing the speeding fines. The main innovative points from this process are the following:

- The Road and Transport Authority (RTA), a governmental body, is responsible inter alia of drivers' traffic files, which includes the speeding fines they have received, and which can be paid directly on the RTA website using the driver traffic file number.

- Instant text messaging (SMS) notification system allows drivers to instantly know when and where they have committed a speeding offence.

- Radar pictures are kept in storage for 6 months in case of payment. They are kept for 14 months if fines are not paid. However, since car registration should be renewed each year and fines are linked to the car traffic file, drivers cannot renew it without settling all their fines.

- Traffic file can be viewed from a mobile app and fines can be paid through mobile. Other payment methods for speeding tickets include: online payment, physical visit to a traffic department, Self-service police kiosks, Emirates bank ATM's and traffic fine management service companies.

- As in France, drivers can appeal a speeding ticket by uploading documents online. It takes five days for a panel to process appeals. In case the appeal is rejected and the driver wants to object in court, then he has to personally visit the Traffic Court.

France and the UAE have improved their systems and records in managing speeding tickets effectively to impact driving behaviors over the years. The most efficient speeding fine processes are the systems that can provide transparency to the public, which makes it harder to argue the validity of the monetary punishment. The sooner the driver knows he's been caught and where, the better it is for changing behaviors (Ruiz, 2016).

CHAPTER III

RESEARCH APPROACH

To accomplish the objectives of this study, the current research used a recently developed type of Cognitive Analytics Management (CAM) framework, known as the SAMAS framework (Osman & Anouze, A Cognitive Analytics Management Framework (CAM-Part 2), 2013), for guidance through the work.

A. The SAMAS Cognitive Framework

The SAMAS framework's goal is to integrate strategic performance management and performance measurement concepts. The aim is to leverage on available information and communication technologies to generate statistical, predictive and prescriptive intelligence. The management and the analytic parts cannot be separated. The SAMAS framework five components are: Shared values to all stakeholders; Analytics; Mission, vision, goals, leadership, culture and communication; Activities and Structures (Figure 6).
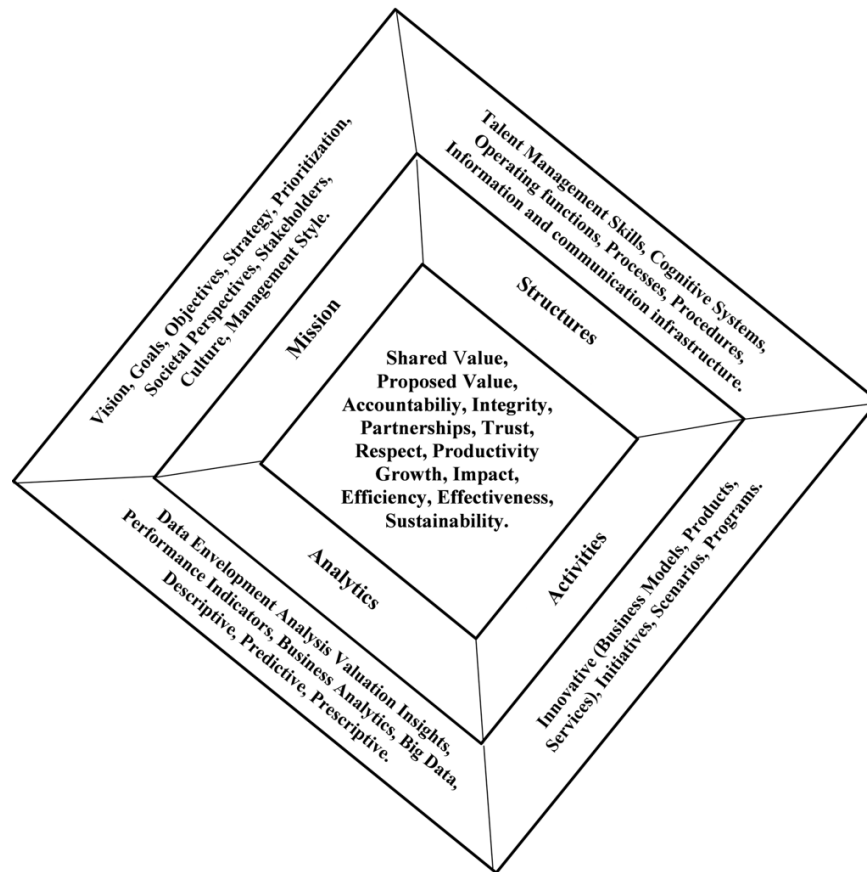
Figure 6: Using the SAMAS Framework, the speeding ticketing process will go through an innovation cycle that will help to make informed decisions, and manage performance to boost growth for the sustainable shared values of this process.

The key goal of the speeding ticketing process is to increase safety; while the aim is to create a deterrent effect and make sure drivers understand that unsafe driving comes at a cost.

Traffic safety is a public concern. It's a shared value between the authorities and the community. Thus, here's one of the main innovative points of the framework: the government moves from creating a public-private partnership to a public-private-community partnership. Again, the aim from fining speeding drivers is not to generate cash but reasonably to have a deterrent effect on speeding drivers. Road Safety experts care about creating a safe system, rather than a safe driver. A system that generates positive cash flow and doesn't improve traffic safety is a failing one. Although safety

improvement on the roads is not only a matter of reducing speed, the state cannot justify continuing a program that generates revenues without improving road safety.

1. *The SAMAS implementation road*

The SAMAS framework is achieved using a 4-strategy procedure, which also includes the following sub-steps:

1. The organization's Eco-system and Social needs identification:

    a. External and internal dimensions, which represent the Eco-system of the institution.

    b. Problem identification and data analytical approach; be it descriptive, predictive or prescriptive.

2. Process definition for data collection: surveys, sensing tools, published sources, meetings, interviews, etc.

    a. Development of Key Performance Indicators (KPIs).

    b. Identification of Critical Success Factors (CSF) and potential measures.

3. The use of the COBRA framework; the Cost and Risk factors are considered as inputs, while Benefits and Opportunities are measured as outputs:

    a. Evaluation of e-government services for speeding fines (Osman & Anouze, 2014).

4. Recommendations: Efficiency scores for proposed initiatives.

5. Leadership commitment and communication strategy to act upon recommendations and implement them successfully.

B. Overview of Data Collection

  The study used a situational assessment to make recommendations and choose a course of action. The project involved the analysis of data and information from the stakeholders of the speeding radar ticketing process. Major Michel Moutran contacted senior officials from Traffic Detachments, LibanPost, OMT and Traffic courts, involved in the process, to set up meetings; which would also facilitate the collection of information and data. The purpose of these interviews was to foster understanding of the current process, identify any useful information for process improvement, as well as to collect data which would help to validate claims of process flaws.

  Another source of information included the public statements released daily by the Public Relations Unit at the Internal Security Forces, regarding the daily number of speeding drivers caught by the radar. The internet search also provided some information from interviews with Traffic safety officials by the press, which discussed the speeding radar ticketing process.

  The data collection plans emphasized collection of descriptive information (Osman & Anouze, A Cognitive Analytics Management Framework (CAM-Part 2), 2013) on the extent to which financial shortfall from the current system can be measured. Descriptive data also helped to validate processes bottlenecks. As shown in Table 1, interviews occurred over approximately a 4-months window beginning in February 2017.

Officials from	Interviewed on
شعبة المرور	15/2/17
فصيلة بيروت	15/2/17
LibanPost	15/2/17
شعبة المعلوماتية	27/2/17
مكتب تنفيذ أحكام السير	2/3/17
شعبة المرور	10/3/17
OMT	20/3/17
محكمة السير في بيروت	7/4/17
مفرزة سير بعبدا	9/5/17

Table 1: List of Interviews conducted as part of the current process analysis and data collection.

It should be noted that some requests for data were turned down [3]. It is hard to get official data requests approved in Lebanon, for various reasons [4]. The data collected from the interviews and used in this study was not given based on officially approved requests, but rather on trust that it is used for research purposes. The established confidence during interviews procured only strict minimum data to help validate conclusions and estimate financial and performance measures.

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[3] A request for interview was turned down by شعبة الشؤون الادارية for security and privacy reasons, after asking if it's possible to discuss the sums that goes to صندوق احتياط قوى الأمن الداخلي from the speeding tickets, which would allow to compare the input value of issued fines with the output sums collected.
[4] Official data requests at the ISF are processed through the Public Relations Section and must be signed by the General Director. For this study, OMT and LibanPost preferred not to give any detailed information in figures that they have during the interviews. Other Data was collected during the interviews.

CHAPTER IV

RESULTS

The interviews yielded a large amount of information on the speeding radar ticketing process. These included questions on the (1) Process and sub-processes; (2) Outputs and eventual targets; (3) available Resources; and (4) Time.

A. Process Flowchart

One of the goals of this study was to draw the current process Flowchart and determine to what extent available resources and lead times impacted the system performance. The meetings helped to identify eight stakeholders involved currently in the process and the actions of each of these entities. Consequently, the process Flowchart was divided into three phases.

The stakeholders involved in the speeding radar ticketing process are (1) Traffic Detachments, (2) Community/Society, (3) the team managing the ISF Website at the IT Section, (4) LibanPost, (5) OMT, (6) Contravener (driver caught speeding by the radar), (7) specialized Traffic Courts, and (8) Local Police Stations.

Consequently, the process Flowchart was divided into three phases:

(1)   From Speeding Radar flashing to SMS Notification.

(2)   Collection process.

(3)   Processing speeding tickets by Traffic Courts.

B. Speeding Radars

Speeding radars are positioned to flash violators from the rear of the vehicle, due to privacy concerns. Police fines speeding cars and not drivers. This is not a controversial issue, as everyone agrees that privacy should be respected even in light of traffic violation. However, it should be signaled that radars, sometimes positioned on a safety passage spot in the middle of the Damascus Highway, somewhere near the Mudairej bridge, are able to flash drivers from the back (towards Beirut) and the front (towards Chtoura).

As mentioned earlier, Lebanon has 15 radars distributed on 16 Detachments. This research couldn't determine which traffic Detachments were using the same radar. But speeding enforcement badly lacks equipment. The Beqaa Traffic Detachments have only two radars at their disposal. The Baabda Traffic Detachments monitors two of the country's major traffic axis (Figure 7) with only one camera: the first stretch is from the ISF headquarters in Achrafieh up to the Mudairej Bridge and the second stretch is from the Chevrolet round-about going south to Jiyyeh. As seen in the Best Practice section from the above, a speeding enforcement strategy to reduce average speed needs substantial resources in terms of equipment: different types of radars and enough of them to cover the main concerns of Traffic Engineers.
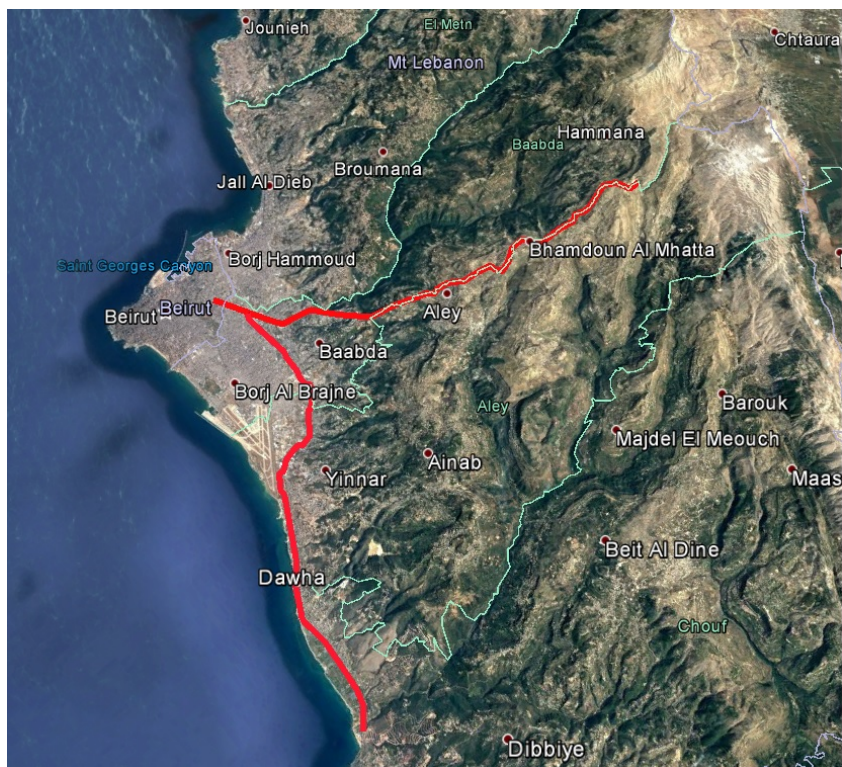
Figure 7: geographical responsibility of the Baabda Traffic Detachment. The roadways are marked in red and are controlled by one speeding radar.

The current radars can record up to 10 hours of footage before having to recharge them. Photos cannot be manipulated or deleted on the equipment. Radars flashes and takes one picture every time a car exceeds the configured speed limit. Photos are retrieved on a USB flash disk and downloaded onto computers for data treatment. Finally, the radars are mounted in police vehicles (Figure 8) and it's usually one policeman who stations and operates the radar as per a pre-fixed schedule that indicates time and location for control.

Figure 8: logo of the vehicle-mounted Speeding Radar.

C. Actual Ticketing Process Evaluation

1. *Evaluation of the 1ˢᵗ phase*

The activities that are related to this first phase are: Processing speeding radar photos, issuing speeding fines and notifying the owners of the flashed cars. This 1ˢᵗ phase Process Flowchart is annexed to the report (Appendix 1) and is detailed in the below "Process-Time-Resource" table (Table 2). The stakeholders involved during this phase are: مفرزة السير, غرفة العمليات المركزية, شعبة المعلوماتية, LibanPost and OMT.

Phase	Stakeholder	Process step	Time to process	Resources
Phase 1	مفرزة السير	Radar flashes speeding cars	3 to 10 hrs	1 person / vehicle
	مفرزة السير	Analyses the radar content and lists manually the information (time, date, location, vehicle type, plate number and speed)	_	1 person
	مفرزة السير	Review photos and enter data on excel	Next day, starts at 8am and takes around 30min for less than a hundred fines	1 person / Traffic Detachment
	غرفة العمليات المركزية	List is sent by email to غرفة العمليات المركزية for vehicles status and is then returned to مفرزة السير	2-3hrs	1 person
	مفرزة السير	Fills yellow fines manually. Prepares 5 different vehicles lists: diplomatic, army, foreign, fake plates and private. Sends lists of fake, foreign, diplomatic and army plates to قيادة العمليات في الدرك. Sends private and foreign cars list to ISF website unit by email. Prepares two lists of private cars for LibanPost and OMT.	Same day or the next day	1 person
	شعبة المعلوماتية	Receives list by email and updates ISF Website Data accordingly	On the same day it receives the lists	1 person from the IT Section
	LibanPost and OMT	LibanPost and OMT pick up the lists on CD's or receives them by email.	24 hrs: On the same day that the lists are prepared or the next day.	LibanPost has 1 pickup guy/6 Units (Beirut and Mount Lebanon) and 1 employee for every other units, elsewise lists are received by email. OMT has one guy handling lists receipt by email or on a CD.
	LibanPost and OMT	LibanPost and OMT transfer lists to call center which notifies contraveners by SMS	24 hrs: Same day or next day; automatic SMS sending process, 3 times a day.	Automated process that sends SMS. For example, 10-12 people work in the LibanPost call center.

Table 2: Phase 1 described in Sub-Processes, with Activity Time and Resources allocated.

Although a theoretical Modus Operando of the current process was provided by شعبة المرور (Appendix 4); this research was able to reconstitute the whole process and analyze it to meet the objectives of this study. The described process in table 2 is then reiterated for the second and third phase. It is thoroughly reviewed in the below listed Action points. They represent facts and observations picked up during the interviews, and are commented to highlight the current situation.

The actions, in order, are as following:

- The first step is to retrieve the data and download it onto a computer by the police member who operated the radar. He then fills speeding cars information in a printed table form, manually with a pencil.

- The next day, his co-worker checks again the photos and car information. He enters the information on an MS excel table and sends it by email to

غرفة العمليات المركزية at the Ministry of Interior, which is linked to the car registry database of the Traffic Management Organization TMO (known as النافعة).

- After receiving comments on car, he then proceeds to create five lists of different car types: military, diplomatic, foreign, fake plates and private. The military, foreign and fake plates' lists are sent to the قيادة العمليات في شرطة بيروت and الدرك, to be distributed to the concerned parties for processing.

- The private cars yellow fines are manually filled. After what, private and foreign cars lists are sent to the IT department of the ISF, to upload them on their website. And finally, two copies of private cars lists are prepared for LibanPost and OMT to pick them up or receive them by email.

- Refer to the "Evaluation of the 2nd phase" for the actions description at LibanPost and OMT.

a. <u>Risk Identification at Traffic Detachments</u>

The identified risks, associated to the above actions, are:

- Data Loss: data is stored on unsecured servers, which are personal computers in some cases. The probability that a computer crashes or catches a virus is high. At the Baabda Detachment, data is treated and stored on the policemen personal computers. The policeman has all the historical speeding radar files stored on his personal external hard disk.

The reason is that he was not provided with a computer to fulfill his mission properly so he had to do with his own means.

- Human Error: all of the actions are done manually. Policemen might copy and recopy wrong plate numbers. They might make mistakes when filling yellow carton fines.

This risk can be illustrated with a real example: a driver receives a ticket in Beirut. He owns a Chevrolet and the fined car is a BMW X5. The error here is that the policeman who copied the plate number replaced mistakenly the letter G on the BMW plate with a letter B, and the fine was sent to the wrong person.

In the below figure 9, the date of the contravention was not indicated on the cartons. Therefore, the driver can't know exactly on which day he was caught speeding.

Figure 9: A ticket with no date of violation: one of the risks of filling fines manually.

- Unethical Behavior: policemen are not monitored when filling fines. They also consult with their superiors whenever they are hesitant to report certain violators. The risk of cancelling a fine for personal or political reasons also exists.

- Ticket Format: although the format was updated last year, the content is still the same and is still filled by hand. The person met from OMT observed that some of the new printed cartons have the same tracking number as the old ones. However, fines have two tracking numbers which are الرقم في الدفتر and الرقم في القطعة (Appendix 6). Thus, this is the only way to differentiate them.

- Ticket Loss: tickets are filled by hand and kept in the Detachment till they are picked up by LibanPost, OMT or contravener himself. They can be lost or damaged not only in Traffic Detachments but also at the Traffic Courts where they pile.

b. Lead Time and Bottlenecks

Manual processing is time consuming which leads to less efficiency. Processing times in phase 1 are viewed using a Gantt chart, to show the ideal Lead Time. Every color in the chart represents a different Cycle Time.

Table 3 — Gantt chart (Phase 1)

		Task	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Phase 1	مفرزة السير	Installs Speeding Radar. Analyzes content.									
	غرفة العمليات المركزية	Reviews and enters data on Excel. Checks plate numbers. Fills yellow fines manually. Prepares 5 different vehicles lists.									
	مفرزة السير	Sends special lists to قيادة العمليات في الدرك. Sends lists to ISF website unit by email. Prepares two lists for LibanPost and OMT.									
	شعبة المعلوماتية	Uploads lists onto ISF Website Database.									
	LibanPost and OMT	Pick up the lists on CD's or receives them by email. Transfer lists to call center which notifies contraveners by SMS									

Lead Time should be less than 48 hrs for car owner to get SMS notification

Daily notifications

Daily notifications

Cars that are flashed speeding on the weekend are notified the week after

Table 3: Gantt chart that shows process ideal Lead Time from Speeding Radar control till SMS notification over a one-week period.

Lead Time is the total time from speeding radar flashing till SMS notification. The Lead Time should be commonly defined by the Traffic Detachment and the drivers (Cachon & Terwiesch, 2013). That is why it starts when the car is flashed speeding by the radar and ends when the car owner receives an SMS notification to inform him that his car has been issued a speeding ticket.

Lead Times, as per the above, should be less than 48 hours during the weekdays and less than 72 hours when drivers are flashed on Friday and Saturday, if the current processes are working with enough resources and utilization is less than capacity.

Major issues, related to capacity and available resources in phase 1, were noted during meetings with Traffic Detachments, LibanPost, OMT and ISF Website Team. These problems are creating bottlenecks:

- Capacity:

The major bottleneck takes place at the third step: "to review the photos and enter the data on MS Excel". The visit to Baabda Traffic Detachment came on the 9th of May. On that day, the policeman was filling data on Excel for the speeding cars caught by the radar on December 28, 2016. The Detachment was more than four months late in issuing speeding tickets. It prompted them to add a member to help catch up the delay.

Usually (however, this is not a rule), Traffic Detachment employees processing speeding fines work in normal daily shifts, according to the public sector working hours:

- Monday to Thursday, from 8a.m. till 2p.m.

- Friday, from 8a.m. till 11a.m.

- Saturday, from 8a.m. till 1p.m.

The employees' productivity is different during the week, especially on Friday, which also effects the output, and makes processing fines in one day by one person improbable.

     o   <u>Variability in Output</u>:

The bottleneck at the third step is not particularly related to one Traffic Detachment. As learned during the OMT meeting, most Detachments send different monthly fine numbers, meaning that when they are late, Detachments try to recover in the next months. The data was not given for this study. But, as an example, the Tripoli Traffic Detachment sent OMT around 1500 fines in February 2017 and 2200 fines in March 2017. This difference is due to previous delays the traffic Detachment faced in processing tickets, as indicated by OMT.

The OMT employee in charge of speeding tickets identified the best performing Traffic Detachments in terms of Lead Time as: Jounieh, Dahyeh and Nabatiyeh.

     o   <u>Input Prediction</u>:

Another noticeable element that shows in figures from the news and from the Baabda Traffic Detachment, is the close number of speeding cars that are flashed daily. This figure is not constant daily; however, numbers are close. This observation was discussed and confirmed during meetings with Traffic officials. It is due to the Traffic Detachments capacity to process tickets with the available resources. The speeding radars are set up around three hours, mostly during night time; although they can run for about ten hours. However, there isn't enough man power allocated to process the speeding radar tickets.

The Baabda Traffic Detachment radar currently flashes around 50 to 60 cars daily (Table 13). The three Beirut Traffic Detachments all together flash around 120 cars daily, and the Jdeideh Traffic Detachment flashes around 80 cars a day. The total flashed cars in one day for the whole country is around 1000 cars (Table 4).

Nov-16	flashed cars	Jan-17	flashed cars
1/11/16	841	1/1/17	1,574
2/11/16	1,280	4/1/17	1,163
3/11/16	841	5/1/17	764
4/11/16	1,063	6/1/17	974
7/11/16	1,111	7/1/17	931
8/11/16	900	8/1/17	947
9/11/16	1,407	10/1/17	872
10/11/16	890	11/1/17	973
11/11/16	1,078	12/1/17	920
12/11/16	870	13/1/17	715
13/11/16	1,133	15/1/17	812
15/11/16	1,047	17/1/17	924
16/11/16	1,233	18/1/17	1,236
17/11/16	978	19/1/17	861
18/11/16	1,041	20/1/17	988
19/11/16	1,051	22/1/17	928
24/11/16	1,020	25/1/17	840
25/11/16	996	26/1/17	685
27/11/16	1,145	28/1/17	823
28/11/16	1,063	29/1/17	1,024
30/11/16	865	31/1/17	858

Table 4: The number of cars flashed for 22 days in November 2016 and January 2017. The figures are issued in daily public statements by the ISF.

Even with a predictable input (expected daily number of tickets), the bottleneck is still occurring at the third step of this phase, due to shortage in human resources.

o   Additional Waiting Time Mismatch:

An additional delay problem that occurs during this phase but does not affect the process Lead time, is posting the car plate numbers for the speeding cars on the ISF website. The stakeholder is شعبة المعلوماتية. The issue comes back in all three phases of the flowchart. Updating the online page is dependent on the lists of car plates that should be sent daily to the website team by the Traffic Detachments and by the Traffic Courts. As per procedure, Traffic Detachments should send the lists to the ISF Website

team before they send them to LibanPost and OMT. The website team confirmed that most traffic Detachments are not sending daily lists. One example shown during the meeting that took place on the 27th of February 2017, was the example of the Baalbeck Traffic Detachment that hadn't sent any list since November 2016.

2. *Evaluation of the 2nd phase*

The 2nd phase Process Flowchart is drawn and attached in Appendix 2. This phase describes the "Collection Process". The involved stakeholders are the following: LibanPost, OMT, Contravener, مفرزة السير and شعبة المعلوماتية. This phase is the lengthiest in Time and includes two collection rounds. The below "Process-Time-Resource" Table 5 presents it in orderly steps.

Phase	Stakeholders	Process step	Time to process	Resources
Phase 2	LibanPost , OMT, Contravener, شعبة المعلوماتية and مفرزة السير	**1st round** of payment collection process, which includes the following steps: Contravener pays the fine. LibanPost and OMT pay, collect yellow tickets and delivers lists of paid/unpaid fines to مفرزة السير. They send SMS to contravener to collect his yellow carton from store. مفرزة السير manually registers paid fines and sends list to شعبة المعلوماتية. شعبة المعلوماتية cancels paid fines from website database.	Up to 17 days, including 15 days to pay the fine.	1 person from the Traffic Detachment and 1 person from the IT Unit .
	LibanPost, Contravener, مفرزة السير and شعبة المعلوماتية	**2nd round** of payment collection, which includes the following steps: LibanPost collects yellow cartons from مفرزة السير. LibanPost delivers fine to adress. Contravener has 30 days to pay the fine or 10 to object in Court from date of receipt. LibanPost delivers lists of paid fines and unpaid yellow cartons to مفرزة السير. مفرزة السير manually registers paid fines and sends list to شعبة المعلوماتية. شعبة المعلوماتية cancels paid fines from website database.	According to LibanPost: Up to 32 days, including 30 days to pay the fine from date of receipt at address. However, by Law, Contravener should only be given 15 days to pay.	1 LibanPost delivery guy, 1 person from the Traffic Detachment and 1 person from the IT Unit.
	مفرزة السير	Traffic Detachment sends unpaid yellow tickets to Traffic Court. It also sends lists of paid fines for double checking.	24 hrs: Same day or next day	1 member of Traffic Detachment

Table 5: Actions and Sub-Processes linked to phase 2, described in "Process-Time-Resource" Table.

According to the Traffic Law of 2012 (Refer to "Background" Part), revenues from the speeding radar fines are distributed as following:

25%	صندوق احتياط قوى الأمن الداخلي
20%	صندوق البلديات
55%	مديرية الجباية التابعة لوزارة المالية

a. <u>Notification and 1st round of revenue collection:</u>

- LibanPost and OMT collect directly the lists on a CD from the Traffic Detachment (example: Beirut Traffic Detachments) or receive it by email (example: Baabda Traffic Detachment). LibanPost first signed an agreement with the Ministry of Interior to notify and collect speeding drivers in 2010; while OMT is a more recent stakeholder in the process and started in late 2015.

- These lists are transferred to central operation centers and logged into an automated SMS notification system that will send text messages to car owners. The study compared text messages from LibanPost and OMT and noted the following differences:

<u>LibanPost</u>:

  o Sends an SMS including violation date and concerned Traffic Detachment.

  o It gives 13 days from notification date to pay.

  o It doesn't send an SMS as a reminder to pay the fine.

  o It doesn't indicate that you can pay the fine directly at the concerned Traffic Detachment.

<u>OMT</u>:

- Sends SMS that indicates which Traffic Detachment flashed the car without the date.
- It gives 14 days to pay from day of SMS notification.
- Sends an SMS 7 days later as a reminder to pay the fine.
- It also doesn't indicate that you can pay the fine directly at the concerned Traffic Detachment.

• Contravener should receive two SMS notifying him of the fine: one from LibanPost and one from OMT. In the first fifteen (15) days, including the notification day, contravener can pay the fine at LibanPost, OMT or directly at the concerned Traffic Detachment. LibanPost charges a 10,000LL commission for its service; while OMT charges 9,000LL. Paying directly at the Traffic Detachment doesn't include any extra charges.

• After this first round of notification and collection is completed, both companies send back the lists they received with an added column to indicate the paid and unpaid fines. The yellow carton fines corresponding to the paid fines are stamped: LibanPost and OMT acquire financial stamps from the Ministry of Finance and the yellow carton fines should be stamped at the Traffic Detachments. Stamps can also be found in libraries for violators that want to pay directly at the Traffic Detachment.

• Contraveners who paid during this first phase receive an SMS to pick up their yellow carton fines from a LibanPost or OMT office.

• At the end of this first round, Traffic Detachments send the lists of paid fines to المعلوماتية شعبة, to remove them from its webpage database. Also, as part of

the procedure, Traffic Detachments send paid white paper fines, copies of the yellow ones, to Traffic Courts for double checking.

b. <u>Delivery to address and 2nd round of revenue collection</u>

- The unpaid fines from the first round are then collected by LibanPost, which sends the yellow cartons to the contraveners' addresses. As stated during the meeting with LibanPost, the delivery employee should show up twice to the address before returning the ticket to the Traffic Detachment.

- Once the recipient receives the fine, he then has two options: to pay the fine within thirty (30) days at a LibanPost office or directly at the Traffic Detachment; or, to object in court within ten (10) days. The first fifteen (15) days, contravener pays the initial amount. The second fifteen days, the fine amount is increased.

   It should be noted that, as per the Law, the fine should be increased and payed within fifteen (15) days at the LibanPost office, from date of delivery-to-address. However, LibanPost indicated during the meeting that Contraveners were given 30 days to pay instead of 15.

- The list of paid fines at LibanPost is returned to the Traffic Detachment with the unpaid yellow fines. The paid fines are stamped and the contravener is notified by SMS to pick up the stamped fine from the post office. The list of paid fines is sent to شعبة المعلوماتية, to remove them from its webpage database.

- Finally, Traffic Detachments send the unpaid fines to Traffic Courts for judgment and processing, which is described in next phase of this chapter.

c. Risk identification in the "Notification and Revenue Collection" processes

The identified risks, in this second phase, are the following:

- Notification:

  o Contraveners are notified by two different SMSs': one from LibanPost and one from OMT. According to OMT, there has been cases in which fines were paid twice; at LibanPost and OMT. The contravener or a family member on his behalf, would each pay in a different place. OMT said that in such cases, the money was reimbursed. However, such errors can occur and this problem can be considered as minor.

  o A noteworthy issue is the fact that a lot of people still don't know that they can pay their fines directly at the Traffic Detachment. LibanPost and OMT make it much easier to pay the fines, charging a commission fee, rather than having to make the trip and loose time and money. Still, citizens should always be reminded by the ISF that they can also settle their fines and pick up their stamped yellow cartons by themselves.

- Revenue Collection:

  o Money stamps are sold by the Ministry of Finance. LibanPost, OMT, Libraries, even supermarkets can sell stamps. Traffic Detachments don't deal with cash money directly. A contravener can buy stamps from anywhere and bring them to the Traffic Detachment that will stamp his fine with the fine amount for proof of payment. LibanPost and OMT do the same. Therefore, there is no proof that the input is equal to the output. Stamps are a lump sum amount. The amount of paid fines can only be tracked through the lists of paid fines sent to the Ministry of Finance by the Traffic Courts. Even if the information can be available to sum up the fine amounts, it takes time to gather and cannot be tracked on a regular basis.

d. Cycle Times and Delays

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54

Phase 1	**LibanPost and OMT**	Procure list of speeding cars SMS notification 1st collection round includes:
	LibanPost, OMT, Contravener, مفرز السير, and شعبة المعلوماتية	Contravener pays the fine. LibanPost and OMT pay, collect yellow tickets and delivers lists of paid/unpaid fines to مفرز السير They send SMS to contravener to collect his yellow carton from store. مفرز السير manually registers paid fines and sends list to شعبة المعلوماتية cancels paid fines from website database.
Phase 2	**LibanPost, Contravener, مفرز السير and شعبة المعلوماتية**	2nd collection round includes: LibanPost collects yellow cartons from مفرز السير. LibanPost delivers fine to adress. Contravener has 30 days to pay the fine or 10 to object in Court from date of receipt. LibanPost delivers lists of paid fines and unpaid yellow cartons to مفرز السير manually registers paid fines and sends list to شعبة المعلوماتية cancels paid fines from website database.
	مفرز السير	Traffic Unit sends unpaid yellow tickets to Traffic Court. It also sends lists of paid fines for double checking.

14 days to pay including SMS notification day

One week time for post delivery

As per LibanPost, 30 days to pay fine in Post office or 10 days to object in court from date of receipt

Table 6: Gantt chart that shows the 2nd phase process Cycle Time which includes two rounds of money collection by LibanPost and OMT.

40

There are two Cycle times in the second phase, which are defined and agreed upon when signing the contract between the Ministry of Interior, on one side, and LibanPost and OMT, on the other side. The ultimate goal for these companies isn't Traffic Safety, but rather revenue generation from the fixed commission fee on each ticket.

- The first Cycle Time is fifteen (15) days. It starts at the SMS notification day and ends on the 15th or 16th day after, when LibanPost and OMT will return the list of paid/unpaid fines to the Traffic Detachment. As mentioned before, LibanPost gives 13 days to pay after notification; while OMT gives 14 days to pay after notification.

- The second Cycle Time is thirty (30) days. It starts when the contravener signs a delivery-to-address notification from LibanPost. From that date, he has thirty days to pay at any LibanPost office or directly at the Traffic Detachment: the fine will be increased in the 2nd half of this period. The other option is to object the fine in Traffic Court. The contravener has 10 days to show in person to Court and submit an objection for ruling.

- Efficiency of LibanPost and OMT isn't monitored by the state. There are no official figures on collection ratios and there are no thresholds or minimum targets for these companies. One particular process that is subject to complain by contraveners is the delivery-to-address system by LibanPost. Some contraveners claim that they never received their tickets at their address; although, their fines still show up on the ISF radar webpage. In the above Gantt chart, this study noted that it should the post employee a one-week period to visit the address twice to deliver

the fine. This one-week period is based on the interview with LibanPost. The accuracy of this claim couldn't be verified.

No official study has been conducted to see the impact on notification and collection, after OMT entered this segment. Some figures related to this matter are exposed in the "Economic Evaluation" paragraph later in this chapter.

The risks and delays that are common to phase 1 are:

- Risk of losing or damaging the yellow carton fine.

- Delay in sending the paid fines list to شعبة المعلوماتية.

- Delay in cancelling the paid fines from the website.

The delays that can occur in phase 2 are:

- Delay in transferring unpaid fines (white tickets) to Traffic Courts.

- Delay in transferring lists of paid fines to Traffic Courts for double-checking.

3. A real driver's case of data analysis

This is a case study of a Lebanese driver who was kind enough to provide his record of speeding tickets for the sake of this research. The information and conclusions are yet more elements to validate previous observations made in evaluating Phases 1 and 2. The car is a Toyota Corolla with the following registration number: B516482. The interest in this case stems from the fact that it was flashed speeding six (6) times in less than two (2) years by three (3) different Traffic Detachments. The car received twice a Category 3 speeding fine (exceeding speed limit by 20 to 40 km/hr.), and four (4) times a Category 2 fine (exceeding speed limit by less than 20 km/hr.).

Reference to the Part Background "Speeding Behaviors and Other Facts", this type of speeding is considered as "Casual Speeding" and the driver is categorized as a "Typical Speeder", which means that the driver is aware that he's speeding and can even engage in higher speeds sometimes (NHTSA, 2016); although this definition might be questionable on the Lebanese roads, where road signage is weak and the violated speed margin is not high. The collected information is exposed in the below Table # and relates to the different activity times and Lead Time described in the first and second phase: Flashing, first notification and payment process involving LibanPost and OMT, second notification and payment process involving only LibanPost, and updates to the official speeding radar webpage.

Traffic Detachment	Violation date	LibanPost SMS	OMT SMS	SMS reminder OMT	LibanPost date to pay	OMT date to pay	LibanPost notification for hard copy receipt at address	Contravener date of payment	ISF Radar Webpage	Amount of fine (LBP)	finally paid (LBP)
Tripoli	23/5/2015	30/7/2015			Not mentioned			8/8/2015	Removed	100,000	110,000
Tripoli	3/6/2015	5/8/2015			Not mentioned			21/8/2015	Removed	100,000	110,000
Dahiyeh	No date on ticket	28/12/2015			Not mentioned		2/2/2016	16/2/2016	Removed	100,000	110,000
Dahiyeh	No date on ticket	11/10/2016	11/10/2016	19/10/2016	24/10/2016	25/10/2016	28/11/2016	5/12/2016	Removed	200,000	212,100
Tripoli	22/1/2017	3/2/2017	No SMS reecived	11/2/2017	16/2/2017	17/2/2017	25/7/2017	10/8/2017	Not removed	100,000	160,000
Jounieh	12/3/2017	23/3/2017	23/3/2017	31/3/2017	5/4/2017	6/4/2017		5/4/2017	Not removed	200,000	210,080

Table 7: *Exposing a casual speeder's record of speeding fines, which includes, but are not limited to, the flashing date and the different notifications and payment dates.*

The above table contains information about Processing Times, but it also shows the evolutions of the whole process:

- The OMT entry into the process's notification by SMS and payment activities in 2016.

- The difference between the number of Days-To-Pay between LibanPost and OMT: 13 days by LibanPost and 14 days by OMT.

- The fact that LibanPost didn't use to indicate a Time limit to pay in its SMS before 2016.

- The SMS reminder to pay one week after the first SMS notification, which is sent by OMT.

- The fact that Traffic Detachments can omit to write some information in the manually filled yellow carton ticket, like the flashing date at the Dahyieh Traffic Detachment; noting that the flashing date isn't mentioned in the notification SMS received.

Information in Table 7 on the different dates from each process were exploited and reorganized in the below Table 8 to show the Lead Time of each major process related to Phase 1 and Phase 2. The table answers the following questions:

- When was the speeding driver flashed?

- When did he receive an SMS notification about it?

- When did he receive the fine at his address?

- When did he pay the fine?

Speeding Driver / Traffic Detachment	Was flashed on	Received an SMS notification	Received the ticket at address	Paid	Total Process Time
Tripoli	23/5/2015	68 days later	–	9 days later	77 days
Tripoli	3/6/15	63 days later	–	16 days later	79 days
Dahiyeh	No date on ticket	28/12/2015	22 days later	14 days later	–
Dahiyeh	No date on ticket	11/10/2016	35 days later	7 days later	–
Tripoli	22/1/2017	12 days later	172 days later	16 days later	198 days
Jounieh	12/3/17	11 days later	–	13 days later	24 days

Table 8: consequent processes Lead Times, starting at the date when the speeding driver was flashed.

The driver is a registered user of HomeService by LibanPost, which means that he pays a yearly fee to make sure that LibanPost has his address and number correctly and they send him an SMS of every service to come and every service done. Still, in three cases out of six, LibanPost was able to deliver him two fines at his address in 22 and 35 consecutively, while he had to wait 172 days to receive the fine that dates back to the 22nd of January, 2017. Although this is only one case of a registered user, it should only push for further research to validate whether there is an issue of delivery to address or not. In the Evaluation of the 2nd Phase, the delivery to address Time showing in the Gantt chart is of one week, assuming every LibanPost local office delivery employee know well his territory. However, this figure should be revised upward. The increase will be hard to define, since the variation is too wide in this case.

The Lead Time between getting flashed and being notified is related to each Traffic Detachments capacity and whether solutions and extra efforts are done when delays accumulate. The treatment of fines in May and June of 2015, at the Tripoli Traffic Detachment, was taking more than two months; whereas this figure dropped to 12 days in January of 2017. And the issue of variability remains since there is sixteen (16) different Traffic Detachments issuing speeding fines, each at its own rhythm.

There is no clear reason why the fines issued by the Dahyieh Traffic Detachment didn't have any date on them. It only adds reason to the fact that filling fines manually can induce unintentional or deliberate errors which lead to flaws in the process and give reason to speeding drivers to object the fining in Court.

During the meeting with OMT, the Jounieh Traffic Detachment was described as the best Detachment in terms of Lead Time, organizing and processing the speeding radar fines. Considering this conclusion to be true, coming from a stakeholder in the process who benefits from reducing Lead Time and notifying a bigger number of speeding drivers, then it can be assumed that the Lead Time of eleven (11) days registered in the above Table is one of the best times that can be achieved in the current processing situation. The estimation done in the Gantt chart of Phase 1 of a three (3) to four (4) days period to receive an SMS notification should then be reevaluated and increased.

4. Evaluation of the 3ʳᵈ phase

The last phase of the process flow chart is "processing speeding radar tickets in the Traffic Courts". The stakeholders involved in this phase are: مخافر ,محاكم السير الدرك (Local Police Stations), Contraveners and شعبة المعلوماتية. The table "Process-Time-Resources" (Table 9) depicts the current processing system at the Beirut Traffic Court. Refer to Appendix 3 for the Process Flowchart.

Phase	Stakeholder	Process step	Time to process	Resources
Phase 3	محكمة السير	Judge issues ruling and sets fine's amount.	1 day	2 judges for Beirut area (3 traffic units)
	محكمة السير	Court sends decree to local police station for delivery to address.	24 hrs: Same day or next day	1 police member for pick-up.
	مخفر الدرك	Police delivers contravener note to pay fine in court. If he's not found at his address, a generalized compelling order is issued.	Up to 14 days	1 police member for follow-up.
	Contravener	Contravener pays or objects fine in court.	Up to 10 days	
	محكمة السير	Traffic Court manually registers paid fines and sends list to شعبة المعلوماتية.	24 hrs: Same day or next day	1 person from Traffic Court.
	شعبة المعلوماتية	شعبة المعلوماتية cancels paid fines from website database.	24 hrs: Same day or next day	1 person from the IT dept.

Table 9: Phase 3 described in Sub-Processes, Activity Times and allocated Resources.

Sixteen (16) Traffic Detachments send unpaid tickets to nine (9) Traffic Courts (Figure 10). Like Traffic Detachment, Courts still process fines manually and create lists using MS Excel. Legally, Traffic Detachments are under the command of قائد الدرك, except for the Beirut Traffic Detachments, which are under the command of قائد شرطة بيروت. Traffic Detachments are considered part of الضابطة العدلية, meaning that their role is also to execute judiciary orders.

At the Beirut Traffic Court, it should be noted that the efforts to computerize processing were undertaken by the employees. Unfortunately, the state granted them a couple of obsolete computers (Pentium 2 processors). صندوق تعاضد القضاة والمساعدين القضائيين offered a couple better computers which are currently being used.

محاكم السير	مفارز السير
محكمة السير في بيروت	مفرزة سير بيروت الأولى
	مفرزة سير بيروت الثانية
	مفرزة سير بيروت الثالثة
محكمة السير في جديدة المتن	مفرزة سير الجديدة
محكمة السير في جونية	مفرزة سير جونية
محكمة السير في بعبدا	مفرزة سير الضاحية
	مفرزة سير بعبدا
محكمة السير في طرابلس	مفرزة سير طرابلس
	مفرزة سير زغرتا
	مفرزة سير حلبا
	مفرزة سير اميون
محكمة السير في النبطية	مفرزة سير النبطية
محكمة السير في البقاع	مفرزة سير بعلبك
	مفرزة سير زحلة
محكمة السير في صيدا	مفرزة سير صيدا
محكمة السير في صور	مفرزة سير صور

Figure 10: Traffic Detachments equipped with speeding radars send unpaid fines to Traffic Courts in their jurisdiction. On the right, are listed the Traffic Detachments and their respective linked to Traffic Court. In the North, the Tripoli Traffic Court gets input from four Traffic Detachments.

a. Processes description at Traffic Court

Traffic Courts receive the unpaid fines after completion of phase 2.

- Judges should rule and set an increased fine amount. Only in cases where

  contravener submitted a written objection that the judge takes time to rule

  the case. In cases of unpaid fines sent by Traffic Detachments, المساعدين

  القضائيين can process the fines quasi-automatically by increasing the fines'

  amounts to the original value (Refer to Chapter 1 Section "Traffic Law of

  2012").

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- The notification process: at Traffic Courts, employees sort the fines by addresses and transfer them to local police stations to notify contraveners at their addresses. Local police must make the contravener sign a delivery note before handing him the increased fine.

- Contravener has ten (10) days to object to the fine or pay in court. An objection is known as طلب اعتراض and people refer to it commonly as استرحام.

- After the ten days' period is elapsed, contravener is notified a 2nd time to execute the court order; after what, Court issues بطاقة الدليل, and local police distributes a note, النشرة, to all security forces. Contravener can then be arrested till payment of the fine (خلاصة حكم). These actions are applicable to violations of "Type 2", "Type 3" and "Type 4".

- Traffic court registers the paid fines manually and makes, on Excel, a list of paid fines that is sent to شعبة المعلوماتية.

- شعبة المعلوماتية cancels paid fines from the speeding radar webpage database.

b. "Type 5" Violation Processing:

A "Type 5" speeding violation (Figure 4) is handled directly by Traffic Courts. It doesn't go through the Phase 1 and Phase 2 of the process. Traffic Detachments send these violations directly to Traffic Courts for judgment. In the meantime, local police are informed and must seize the car. The contravener must then settle the case in court.

In case the local police cannot find the offender, a generalized compelling order (بلاغ بحث وتحري) is issued to arrest him.

The last judgment for such a type of driving offense, at the Beirut Traffic Court, goes back to July 7th, 2014.

c. Processing Facts from Traffic Courts

In 1970, the Beirut Traffic Court had ninety (90) employees and there were 20,000 registered cars in the country. Today, there are One and a Half Million registered vehicles in Lebanon, and the Beirut Traffic Court number of employees is down to fifteen (15). This study lists here some important facts related to processes in Phase 3:

- o Judges have the power and authority to cancel fines.
- o The Lists of paid fines are sent from the Traffic Detachments to the Traffic Courts, which send them in turn to the Ministry of Finance for verification and double-checking.
- o A driver who lives in Halba (North-East of Lebanon) and was caught speeding in Beirut has to show up in person to the Beirut Traffic Court, which means that he/she have to take a day off to settle the fine or object to it. This point is visited again in the "Economic Evaluation of Traffic Court Data" Section of this Part (Figures 12, 13 and 14).
- o Driving contraventions and rulings (أحكام السير) go on the judicial record (السجل العدلي). They should show up on the Driving Record (السجل

(المروري), which unfortunately is still not activated (Refer to Part

Background "Speeding in the Traffic Law of 2012").

o   According to the Traffic Law of 2012, revenues from processing speeding

radar fines at Traffic Courts are distributed as following:

صندوق تعاضد القضاة	30%
الصندوق التعاوني للمساعدين القضائيين	25%
صندوق احتياط قوى الأمن الداخلي	20%
صندوق البلديات	15%
مديرية الجباية التابعة لوزارة المالية	10%

d. <u>Lead Time and Bottleneck</u>

Phase 3	محكمة السير	Judge issues ruling and sets fine's amount.
	مخفر المرك	Court sends decree to local police station for delivery to address.
		Police delivers contravener note to pay fine in court. If he's not found at his address, a generalized compelling order is issued.
	Contravener	Contravener pays or objects fine in court.
	محكمة السير	Traffic Court manually registers paid fines and sends list to شعبة المعلوماتية
	شعبة المعلوماتية	شعبة المعلوماتية cancels paid fines from website database.

Day: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

One week time for police notification at address

10 days to pay or object in Court

Table 10: Gantt chart to show the 3rd phase process Lead Time and other activity times including the notification and processing by Traffic Courts.

Lead Time in Phase 3 starts with the ruling at Traffic Court (in all Type 2, 3 and 4 cases, it's an increase to the fine amount) and ends up when the Contravener signs the delivery receipt and the local police hands him the fine. This research estimated at One Week the Lead Time in the above Gantt chart. However, this is only an assumption. It should also be noted that local police try to call Contravener on the phone. In case he answers, he's summoned to the station to pick up his fine. After signing the delivery receipt, the Contravener has ten (10) days to show up to court in person to pay the fine or object to it. In case of no show, the General Law (القانون العام) is applied.

- Capacity:

The capacity issue is creating bottlenecks:

- at Traffic Courts (ruling process)
- at local police stations (notification process)

Understaffing is a major problem at Traffic Courts and is creating a bottleneck at the first step of phase 3. The interview at the Beirut Traffic Court took place on the 7th of April. No speeding radar fine from 2017 had been processed yet. However, an interesting fact to note here is that the Beirut Traffic Court allows its employees to work Over-Time and pay them for these extra-hours from the صندوق تعاضد القضاة and الصندوق التعاوني للمساعدين القضائيين.

Two judges hold office at the Beirut Traffic Court. Even with a predictable input of radar speeding tickets, the Beirut Traffic Court processes all traffic violations, which delays all tickets in the system.

This study can't confirm understaffing at local police stations with figures and examples; however, it is probably very true.

- The abandoned role of مكتب تنفيذ أحكام السير

مكتب تنفيذ أحكام السير has renounced to his role in the speeding radar fines process due to his limited capacity and resources. This is why it doesn't appear as a stakeholder in this phase. For the speeding radar tickets, the bureau's defined role is to deal with the local police stations and coordinate the distribution and notification of fines with them. The traffic courts should send fines to مكتب تنفيذ أحكام السير. They should also be sharing a common database for traffic records of drivers (Refer to Part Background "Speeding in the Traffic Law of 2012".

- Waiting Time Mismatch:

This common waiting time in all phases is the delay in updating the ISF radar webpage database. Beirut Traffic Court sends usually the lists of paid fines to شعبة المعلوماتية every three to four months, as confirmed during the interview. One example shown at the Traffic Court during the interview was a list of speeding fines from 2010 that was sent to شعبة المعلوماتية in March of 2015.

- Risk of Loss or Damage to the tickets:

Also present in all phases of the process, the risk of damaging or loosing tickets in this phase was mentioned during the interview with مكتب تنفيذ أحكام السير that had to restore a number of unprocessed tickets damaged recovered at the Baabda Traffic Court.

5. *Analysis of Traffic Court Data*

The study requested from the Beirut Traffic Court to provide ten (10) cases of processed fines for the purpose of this study. Although ten fines represent only a very small number to help validate any conclusion, it gives information about the process Lead Time in these cases. In the next Part, this data helps to evaluate the financial impact of fines processed in Court.

رقم ضبط محضر القطعة في الرقم	مفرزة السير	Police Shift Number	Fining Date	Judgment Date	Payment Date at Court	Carton Format	LibanPost Tracking #	Notes
J177158	6781	بيروت الأولى	36495	17/10/2011	07/01/15	03/11/16	Old	No	Objection to fine in Court
K11272	N/A	بيروت الأولى	38943	07/06/13	05/10/15	03/11/16	Old	Yes	Objection to fine in Court
J1328403	N/A	بيروت الأولى	38943	26/01/2014	13/5/2016	23/11/2016	Old	Yes	Objection to fine in Court
K335443	N/A	بيروت الأولى	38943	27/2/2015		02/03/17	Old	Yes	Fined before new Law application on 22/04/2015
K512795	N/A	بيروت الأولى	23166	12/09/15		06/03/17	Old	No	
K542519	5360	بيروت الثانية	46345	18/12/2015		22/2/2017	Old	No	Diplomatic car (consular plate)
K780114	4265	بيروت الأولى	45013	13/07/2016		05/12/16	Old	No	
A415444	5795	بيروت الأولى	45013	22/09/2016		23/02/2017	New	No	
A402997	2027	بيروت الثانية	46345	27/10/2016		23/02/2017	New	No	
A405346	2676	بيروت الثانية	46245	22/11/2016		07/03/17	New	No	

Table 11: Ten cases processed by the Beirut Traffic Court that provide Lead Times and other information.

The double-lined border between the fourth and the fifth fine separates the contraventions for cars flashed before the application of the new Traffic Law and the ones flashed after. Information, including the multiple tracking numbers, the contravention carton format and the LibanPost tracking number, are also deemed meaningful and are included in the table:

- Tracking number: الرقم في القطعة is considered as a 2nd tracking number (Refer to "Evaluation of Phase 1" of this Part). It is hand filled at the

Traffic Detachment. It was not filled by the Beirut 1st Traffic Detachment in four fines from three consecutive years.

- Carton Format: although a new format for fines was introduced in the summer of 2016, the information to fill, including tracking numbers, was kept as is.

- LibanPost tracking number: this column indicates that these fines were delivered to address, which means that they were processed in Phase 2 and were settled in Court. The tracking sticker can be peeled off the fine; thus, it can't be concluded if the other fines were delivered to contraveners in Phase 2 or in Phase 3 by the local police station.

محضر ضبط رقم	Fining date	Judgment date	Payment date at Court	Amount paid in Court	ISF radar webpage on 11/07/2017
J177158	17/10/2011	07/01/15	03/11/16	50,000	Not removed
K11272	07/06/13	05/10/15	03/11/16	50,000	Not removed
J1328403	26/01/2014	13/5/2016	23/11/2016	50,000	Not removed
K335443	27/2/2015		02/03/17	50,000	Not removed
K512795	12/09/15		06/03/17	100,000	Removed
K542519	18/12/2015		22/2/2017	100,000	Removed
K780114	13/07/2016		05/12/16	100,000	Removed
A415444	22/09/2016		23/02/2017	100,000	Removed
A402997	27/10/2016		23/02/2017	100,000	Removed
A405346	22/11/2016		07/03/17	100,000	Not removed

Table 12: Traffic Court data with added columns to show the final amounts paid in Court to settle fines and which fines still show on the ISF speeding fines webpage.

- Financial revenues: in all the cases from Table 12, contraveners ended up paying the original amount of the fine. Most fines, when brought to Court, have an increased amount. Although fines generate cash revenues for courts, the Beirut Traffic Court assured that it deals with all cases from a humanitarian point of view, as the first objective of fining drivers is to

change their driving behaviors. However, this study can't confirm if increased fines are reduced back to their original amounts in Traffic Courts other than Beirut.

- Updates to the ISF speeding radar webpage: the oldest fines still show online while the more recent ones have been removed. This shows that the lists sent to the IT Detachment at the ISF are not organized by date. The lists are randomly sent.

The Lead Time, from the speed radar flashing date till Court payment, is illustrated in the below Gantt chart of the 10 fines (figure 11). The chart is drawn using: the fining data, the judgment date in the first three cases (considered as an activity time in the chart) and the payment date at Court. The figures inside the bars represents the number of days from start to end of Lead Time and activity time. The fines are consecutively presented in Time, from the oldest to the most recent one.

Beirut Traffic Court Data
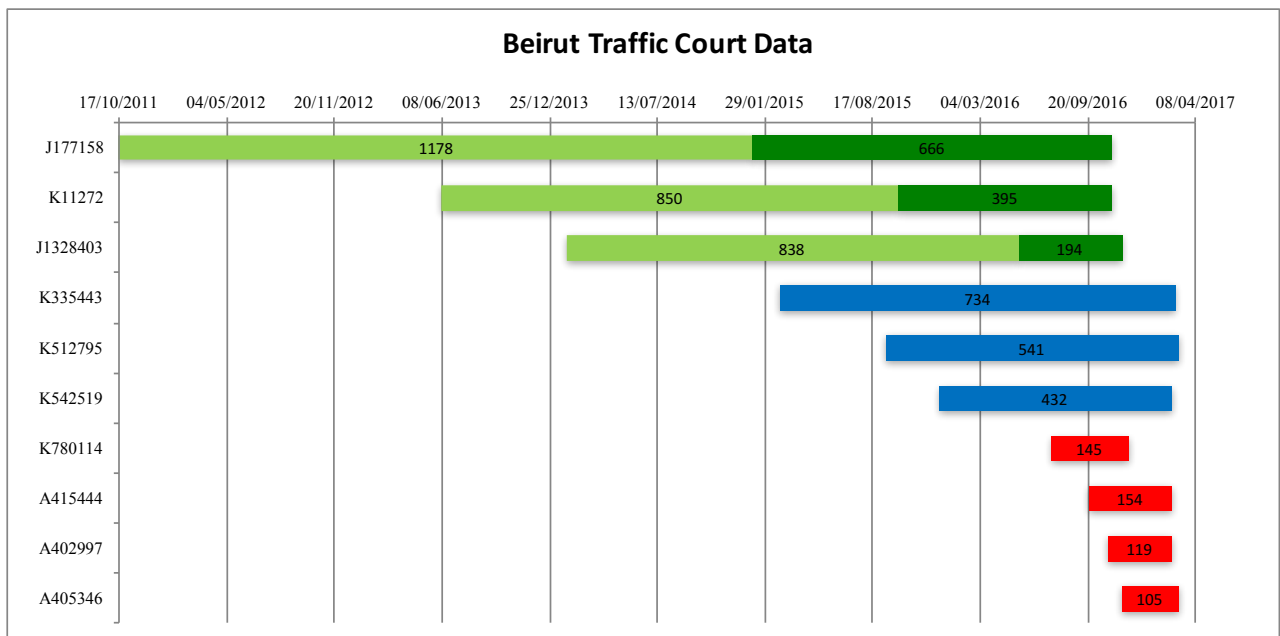
Figure 11: Gantt chart that represents Lead Times in days, from the speed radar flashing date till Court payment. The first 3 fines also include the cycle times from the speed radar flashing date until the objection was submitted in Court.

The first conclusion point comes from looking at the shape of the chart. It seems as if the Lead Time has decreased over the years. Starting in the second half of 2016, the Lead Times registered are below five months. Whereas before that date, all fines Lead Times are beyond the one-year time period. Indeed, the processing capacity at the Beirut Traffic Detachments and Traffic Court has most probably been improved over the years:

- o   For the three Beirut Traffic Detachments, one room with four working stations process the steady daily input of radar speeding photos (a total of around 120 daily speeding fines; with approximately 40 fines from each of the three Traffic Detachments). At the Beirut Traffic Court, the employees initiated the creation of Excel databases of the traffic fines, consciously admitting that their processing capacity is affecting them and the Contraveners.

The second point is related to Contraveners. When in Phase 2 of the process, Contraveners go to Court when they receive an increased fine and ask for what is commonly known as استرحام. Therefore, the seven fines from the chart that were not judged in court, can be increased fines that were paid in Court to have a reduction on the fine amount.

The last point concerns the first three cases that were ruled in Court, as criminal cases. Between the flashed speeding date and the judgment date in court, the Lead Time is more than two and a half years. It took three and a half years to judge the first case in Court and then less than two years for the contravener to pay the 50,000L.L. reduced amount for settlement. The bottleneck cannot be identified in this case.

Somewhere, at some activity, one or too many, the waiting time for processing the fine got too long. And the final Lead Time result was less than five years.

6. Economic evaluation using Traffic Court Data

Reference back to Table 12, a Cost-Benefit analysis is done using the amounts collected at the Traffic Court from the ten (10) sample cases. The breakdown helps to estimate the impact of revenues recovered at the end of the process against the direct and indirect costs of activities in the speeding radar ticketing process.

Radar Speeding Ticketing Process
Cost Breakdown and Net Income

	Amounts in LBP
Revenue	
Amount paid at the Traffic Court	50,000
Costs	
Direct Cost	
Radar Activity	
Police agent	13,000
Transportation	6,000
Processing at Traffic Unit	
Employee(s)	1,450
Supplies	1,000
Processing at Traffic Court	
Judge	6,700
Court employee(s)	1,450
Local Police force	750
Indirect Cost	
Contravener	
Transportation	4,000
Productivity	30,000
Total Cost	64,350
Net Loss	**14,350**

Figure 12: Cost breakdown for the first three fines listed in Table 12; these cases were processed in Court and judged. The amount paid by the speeding drivers doesn't cover the costs of the process.

The above figure is representative of the first three cases in Table 12, meaning that it estimates the cost when the case is presented before a judge and a penalty ruling is issued. The following figures were considered in the estimation of the total cost:

- Traffic Detachments: It was estimated that a police agent responsible for the vehicle-mounted speed radar and other agents assigned to process speeding tickets at the Traffic Detachment work 72 hrs. per week and have a basic salary of 1,300,000 LBP (without transportation allowance), which is the pay for the grade of رقيب اول. The radar is activated for three hours per day, on average. Every activity time at the Traffic Detachment is estimated at five (5) minutes per fine (listing, filling on Excel, checking and filling the yellow carton).

- Traffic Courts: it was estimated that a judge's basic monthly salary is 12,000,000 LBP and the working hours for a judge are 35 hrs. per week. Every speeding fine case hearing and judgment will take an average five (5) minutes of his time. A court employee works an administrative schedule of 35 hours per week and is paid an average of 1,300,000 LBP per month. The local police force salary and work schedule is considered as one as the Traffic Detachments.

- Contravener: he has to show up in person to Court. Therefore, he will pay for transportation, estimated as the cost of a two-way trip in a taxi service, and will lose productive time from his work to make this trip. An employee can work 21 days per month for a salary of 1,300,000 LBP and loose half a day to settle his case in Court.

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The final outcome from Figure 12 shows that cases that are settled at the old fines basic amount of 50,000 LBP don't cover the total costs for the whole process. However, as shown in the below Figure 13, these costs are covered and revenues are positive when the fines values are at 100,000 LBP. The total cost can even decrease when cases are not reviewed by a judge and are handled directly by the Court employees and رئيس قلم محكمة السير. As mentioned before, fined drivers look to Court to cancel the increase on the ticket, a request that is easily attainable at the Beirut Traffic Court.

Radar Speeding Ticketing Process
Cost Breakdown and Net Income

	Amounts in LBP
Revenue	
Amount paid at the Traffic Court	100,000
Costs	
Direct Cost	
Radar Activity	
Police agent	13,000
Transportation	6,000
Processing at Traffic Unit	
Employee(s)	1,450
Supplies	1,000
Processing at Traffic Court	
Court employee(s)	1,450
Indirect Cost	
Contravener	
Transportation	4,000
Productivity	30,000
Total Cost	56,900
Net Income	**43,100**

Figure 13: Cost breakdown for the fines listed in Table 12 and settled in court for 100,000 LBP; these cases were not judged. The total cost doesn't include the judge cost and local police for notification. The final income is positive.

Figure 14: Citizens waiting to pay at the payment counter of the Beqaa Traffic Court, in Zahle. This picture was taken last May. The Traffic Court in Zahle covers all of the Beqaa Region.

D. Value Analysis of the Process

Understanding the process also meant that the financial aspects of the different activities have to be evaluated. Valuing the system accurately wasn't possible since the financial data from Stakeholders wasn't available for sharing with this study. However, estimations were possible using the following data:

- ISF daily released public statements about the number of cars flashed for speeding, which are available on the ISF website.

- Figures from the Baabda Traffic Detachment about the fines recorded in November of 2016 and which were paid up to March of 2017, during the first notification and collection process in Phase 2.

- The delay in processing fines at the Baabda Traffic Detachment, which gives an estimate of the financial shortfall from the current process.

- The paid fines at the Traffic Court Data, to estimate the costs of the process and compare to the cash revenues from the fines.

Diagnosing the system's financial health is a fundamental step for making reasonable improvements to the current process or for proposing a new system. This study will first show and analyze data collected at the Baabda Traffic Detachment.

1. Estimating the Financial Shortfall at the Baabda Traffic Detachment

The ministry of Finance has recently circulated a form to be filled monthly by Traffic Detachments that shows the number of fines that were paid for during this month by LibanPost and OMT. This study tried to do this exercise with the Baabda Traffic Detachment for the month of November of 2016. This particular month was chosen since all November fines were sure to have been issued by the Traffic Detachment and to have completed the first fifteen (15) days notification and collection process by LibanPost and OMT. Still, the total number of speeding tickets from November had to be estimated, as well as the number of fines that were paid directly at the Traffic Detachment. The figures of the month of December were also available and are presented here.

Speeding Radar Activity (Week of April 17, 2017)	
Monday 17/04	61
Tuesday 18/04	53
Wednesday 19/04	52
Thursday 20/04	58
Friday 21/04	51
Saturday 22/4	53
Sunday 23/4	60
Week Total	**388**

Table 13: Speeding Radar Activity at the Baabda Traffic Detachment for the Week of April 17, 2017. The Speeding Radar totalized 388 speeding cars that were flashed during this week.

The estimated number of fines issued for the month of November 2016, was projected as following:

- Assumed 388 is the average weekly number of flashed speeding cars

- Assumed daily averages for the past months as the daily indicated figures from Table 13.

- November 2016 started on a Monday and ended on a Wednesday.

- Assumed an 8% of flashed speeding cars as processed by other Detachments; therefore, are not included in the final total sent to LibanPost and OMT to notify and collect (foreign plates sent to ISF Central Operations, political plates, etc.).

Weekly average	388
x 4	
	1552
Tuesday average	53
Wednesday average	52
Total average cars flashed	1657
8% to be processed by other Units	133
Estimated final # of fines	**1524**

Therefore, the average fines issued in November would be equal to 1524 fines. At the end of Mars 2017, the Detachment estimated that it had collected the following amounts from LibanPost and OMT, related to the speeding fines of November 2016:

	Fine Category	# of paid fines	Revenues
LibanPost	100,000	118	11,800,000 L.L.
	200,000	46	9,200,000 L.L.
	350,000	6	2,100,000 L.L.

	Fine Category	# of paid fines	Revenues
OMT	100,000	170	17,000,000 L.L.
	200,000	70	14,000,000 L.L.
	350,000	3	1,050,000 L.L.

The total number of paid fines collected by OMT and LibanPost during the first notification and collection activity of Phase 2, is then equal to 413 fines for a total revenue of 55,150,000 L.L. The Detachment also estimated that 300 fines had been paid directly by the speeding drivers at its offices. The estimated number of fines still to collect after, at least, four (4) months are presented here below:

	# of fines	Value in L.L.	% of Total
Total # of fines (estimate)	1524	203,200,000	
LibanPost (collected till 31/3/17)	170	23,100,000	11%
OMT (collected till 31/3/17)	243	32,050,000	16%
Estimated paid fines directly at unit (till 31/3/17)	~300	40,000,000	20%
Total left to collect (estimate)	**~811**	**108,050,000**	**53%**

Table 14: The estimated number of fines and revenues still to collect for the month of November 2016, at the Baabda Traffic Detachment.

For this particular month of November, OMT collected and paid for more fines than LibanPost. Still, collection percentages for the two companies are low. The number of fines that were paid directly at the Traffic Detachment is higher than the number of fines collected by the LibanPost and OMT individually. The rate of collection, after speeding drivers were informed by SMS of the fine, is estimated at only 47%.

When the meeting at the Baabda Traffic Detachment took place on May 9, 2017, it had processed 1390 fines from the month of December, 2016, and still had 361 speeding cars flashed to verify and fine. The unprocessed cases represented the last four days of December. The Detachment had 133 days of delay in the process. From the 1390 fines already sent for collection, only 270 had been paid on the 9th of May, which is less than 20% (Table 15) already collected more than four months after the violations were registered.

	# of fines	Estimated Value in L.L.	% of Total
Total # of fines in-process	361	48,133,333	
Total # of processed fines	1390	185,333,333	
Estimated number of paid fines @ May 9, 2017	270	36,000,000	19%
Estimated total left to collect	**~1452**	**~193,600,000**	**81%**

Table 15: the estimated number of fines that date back to December 2016 and are still to be collected; with their estimated value.

Finally, the number of cars flashed from the beginning of the year 2017 that should have completed the first 15 days' phase of notification and payment was estimated. The value of these fines was estimated too, in order to sum up with the financial shortfall from November and December of 2016. The final sum would represent the estimated financial shortfall resulting from the delays in processing at the Traffic Detachment, and would give a general idea of what might be the situation at other Traffic Detachments.

Weekly Radar Missions	Number of Cars Flashed	Estimated number of cars flashed by Baabda Detachment
2/1/17	5,992	323
6/2/17	6,972	376
13/2/17	6,657	359
13/3/17	6,688	361
20/3/17	7,681	414
4/4/17	6,387	345
17/4/17	7,191	388
1/5/17	7,044	380

Table 16: the weekly number of cars flashed are released by the ISF as public statements. The number of cars flashed issued from Baabda Detachment were estimated using the ratio of Total violations to Baabda violations from the week of April 17th, and generalizing it to all the other weeks.

Using the estimated figures from Table 16, the average number of cars flashed weekly by the Baabda Traffic Detachment is the average of all the weekly figures from the last column, which is equal to 368 speeding cars flashed per week. The timeline for estimating the financial shortfall is from the start of the year till two weeks before the interview was done. This reason is that during the last two weeks, the fines were still

being collected by LibanPost and OMT and are considered not to have been paid at the

Traffic Detachment yet. The number of weeks, according to this timeline, is then equal

to sixteen (16) weeks. The estimated percentage of collection during the fifteen (15)

days period of notification and collection, considering that a proper process should have

the fines issued in three to four days, is 50%.

Estimated Weekly Average Flashed Speeding cars	368
Number of weeks	16
Total # of cars flashed	**5,888**
Percentage of fines for processing by others	8%
Fines sent to LibanPost and OMT	**5417**
(Considered two-thirds of fines to be of Category 2 and one-third to be of Category 3)	
Estimated value of these fines in LBP	722,261,333
Estimated value of these fines in USD	**479,112**
% of collection in the first 15 days	50%
Estimated shortfall in LBP	361,130,667
Estimated shortfall in USD	**239,556**

Figure 15: Estimated shortfall in revenues from the beginning of the year 2017 till May 9, at the Baabda Traffic Detachment.

The financial prejudice, due to delays in processing fines at the Traffic

Detachment, is estimated at around 240,000$. This figure is minimal as the conditions

were chosen to be logical but on the safe side. It can be reviewed and increased in case

the ratios change. Also, due to the fact that this financial evaluation concerned only one

Traffic Detachment, the estimated shortfalls cannot be generalized or multiplied by

sixteen (16), which is the number of Traffic Detachments, to get the estimated shortfall

for all the speeding fines in Lebanon. Some Traffic Detachments are doing better in

processing speeding radar fines (confirmed examples from the interviews: Beirut,

Dahyieh, Jounieh and Nabatieh Traffic Detachments). Other Traffic Detachments

probably face the same type of delays. The financial evaluation from the Baabda Traffic

Detachment can be summed up as following:

Estimation of the Total value of fines that are unprocessed and uncollected yet:

	Estimated Value in LBP
Total left to collect (November 2016)	~108,050,000
Total left to collect (December 2016)	~193,600,000
Total left to collect (starting January 1st, 2017)	~722,261,333
Estimated total left to collect LBP	**915,969,383**
Estimated total left to collect USD	**607,608**

Estimation of what should have been collected (in the 15 days of payment notification) if there were no delays in process:

	Estimated Value in LBP
Estimated delayed in process (December 2016)	72,374,667
Estimated delayed in process (starting January 1st, 2017)	361,130,667
Estimated total delayed in process LBP	**433,505,334**
Estimated total delayed in process USD	**287,566**

Figure 16: Estimated total value of the unprocessed fines and the relative shortfall in revenues from December 2016 the till May 9 of 2017, at the Baabda Traffic Detachment.

Finally, it wouldn't be exaggerated to say that the financial shortfall, due to the lack of resources to process the fines at the Traffic Detachments, is a figure that can be estimated at more than the symbolic threshold of one million dollars. It might also be way above that number, considering the estimated figures from the above.

2. *Estimating the Total Shortfall from the Current Process*

Working by extrapolation, using the same ratios used for estimating the financial shortfall at the Baabda Traffic Detachment, the study estimated this shortfall for all the Traffic Detachments involved in monitoring speed using radars and issuing speeding tickets, for the first six (6) months of the year 2017. These revenues from the process that are uncollected are considered as loss and could have been used to improve the system. The final figure from the shortfall can be compared to the cost of the re-designed system in "Part V – Recommendation".

Weekly Radar Missions	Number of Cars Flashed
2/1/17	5,992
16/1/17	6,695
23/1/17	5,907
6/2/17	6,972
13/2/17	6,657
21/2/17	5,788
13/3/17	6,688
20/3/17	7,681
28/3/17	5,458
4/4/17	6,387
17/4/17	7,191
1/5/17	7,044
8/5/17	7,138
22/5/17	7,138
Equal to: 102 days	Total: 92,736 cars flashed

Figure 17: Weekly number of flashed cars by all Traffic Detachments, as issued in public statements by the ISF.

The numbers showing in Figure 17 were used to estimate the total number of cars flashed during the first half of 2017. It was then estimated that 8% of cars flashed are processed by other Units (Foreign plates, military, etc.). The first collection activity after SMS notification was estimated at 50% of the total amounts of issued fines, noting that issued fines were distributed only between Category 2 and 3. As for the delivery-to-address activity and processing at Traffic Courts, it was estimated that they can collect 80% of the tickets left. Therefore, 20% of the remaining tickets were considered as unpaid.

Projections for the first six months of 2017 (till end of June)	
Average daily number of cars flashed	909
Flashed in the first six months of 2017 (equal to 181 days)	164,561
Number of fines processed by other Institutions (8% of total)	13,165
Estimated number of issued speeding tickets	151,396
Estimated number of "Category 2" tickets (2/3 of Total)	100,931
Estimated number of "Category 3" tickets (1/3 of Total)	50,465
Estimated Value of Total tickets issued (in LBP)	20,186,149,333
Estimated Value of Total tickets issued (in USD)	13,390,480
Estimated revenues collectible at Traffic Units, LibanPost and OMT, by the end of 2017 (50% of total tickets value), in LBP	10,093,074,667
Estimated revenues collectible at Traffic Units, LibanPost and OMT, by the end of 2017 (50% of total tickets value), in USD	6,695,240
Estimated Amounts left to be collected by LibanPost (delivery-to-address) and Traffic Courts, in LBP	10,093,074,667
Estimated Amounts left to be collected by LibanPost (delivery-to-address) and Traffic Courts, in USD	6,695,240
Estimated revenues collected by LibanPost (delivery-to-address) and Traffic Courts at 80%, in LBP	8,074,459,733
Estimated revenues collected by LibanPost (delivery-to-address) and Traffic Courts at 80%, in USD	5,356,192
Estimated financial shortfall (in LBP)	2,018,614,933
Estimated financial shortfall (in USD)	1,339,048

Figure 18: Estimated financial shortfall in revenues for the first six months of 2017, for the whole speeding ticketing process.

The estimated financial shortfall for the speeding radar ticketing process, concerning all of the 16 Traffic Detachments equipped with radars, during the first half of 2017, is estimated at more than 1,339,000$.

E. Development of KPIs' and CSF

The third step of the SAMAS framework is to develop Key Performance Indicators (KPI) and identify Critical Success Factors (CSF). This step can also be carried out after a new proposed system or improvements are recommended. However,

the goal of proposing a list of KPIs' to monitor the current system's operational efficiency and financial performance is to state that the system as-is can be improved is the process-related activities are tracked and remedial measures are adopted.

Evaluation Questions	Indicators	Data Collection		Timing	Data Analysis
		Source	Method		
How fast are the fines uploaded online after the radar flashing and how fast are the paid fines removed?	Lead Time to upload speeding tickets to the ISF radar webpage and Lead Time to remove paid fines from the website	شعبة المعلوماتية	the Dates of the emails sent to شعبة المعلوماتية from مغارز السير ومحكمة السير and the dates of uploading information to the system or removing it by شعبة المعلوماتية.	1 year	Find the reasons for the delays in uploading the lists of contraventions and cancelling the paid fines
Are the numbers of flashed constant over the week? Is it related to the processing capacity?	Numbers of daily flashed speeding cars	مغارز السير	The daily lists prepared by مغارز السير	1 year	Link the numbers to the processing capacity of Traffic Units
How efficient is the SMS notification activity?	Collection rate after the first 15 days-to-pay	مغارز السير	Excel sheets to be filled by مغارز السير indicating when was the fine paid (at which phase) and by who (LibanPost, OMT or Contravener)	1 year	Evaluate the efficiency of the SMS notification system. Also, understand the حلزستمرار phenomenon which is to wait to receive the yellow ticket at address and ask the Court for a reduced fine.
How efficient is the delivery to address from LibanPost in collecting fines?	Collection rate of fines delivered-to-address and Number of fines sent to Traffic Court	مغارز السير	Excel sheets to be filled by مغارز السير indicating when was the fine paid (at which phase) and by who (LibanPost, OMT or Contravener)	1 year	Evaluate the efficiency of the delivery-to-address activity.
What is the Utilization rate and capacity at the Traffic Court?	Number of speeding tickets processed daily	محكم السير	Total daily cases of speeding tickets reviewed by the Judge and total daily cases treated by the Court employees	1 year	Evaluate the Court capacity to process fines with the available resources
What is the Lead Time to judgment for the unpaid fines?	Lead Time to judgment at Court	محكم السير	Judgment date on every daily case of speeding fine	1 year	Evaluate whether the delay is due to Court capacity or to the local police stations
What are the revenues after the first 15 days-to-pay period?	Revenues and paid tickets collected in the first 15 days	مغارز السير	Excel sheets to be filled by مغارز السير indicating when was the fine paid (at which phase) and by who (LibanPost, OMT or Contravener)	1 year	Estimate revenues in the first 15 days-to-pay
What are the revenues from the delivery-to-address activity?	Paid tickets collected from yellow tickets delivered to address	مغارز السير ومحكم السير	Excel sheets to be filled by مغارز السير ومحكم السير indicating when was the fine paid (at which phase) and by who (Contravener or LibanPost)	1 year	Estimate revenues from the delivery-to-address activity
What are the revenues from processing speeding fines at Traffic Courts?	Revenues and paid tickets from the Traffic Court	محكم السير	Excel sheets to be filled by محكم السير indicating the date of payment and the amount	1 year	Estimate revenues at Traffic Court

Table 17: Key Performance Indicators of the current process with sources, data collection techniques and type of analysis to be performed.

The evaluation questions and indicators cover the three phases of the process and all the main activities where delays and variations were identified in the previous evaluations of the process:

- Lead Times to process fines at the Traffic Detachments.

- Variability in the number of Traffic Detachments and Traffic Courts

- Variability of outputs and resources.

- Lead Times to upload fines to the ISF website.

- Lead Times to deliver fines to Contraveners' addresses.

- Lead Times to process fines by Traffic Courts.

They also aim to evaluate the results of LibanPost and OMT, responsible to notify contraveners and collect money, as well as to evaluate the استرحام phenomenon among contraveners and at Traffic Courts. The last indicator is related to the revenues generated at the Traffic Court from the speeding fines. In total, nine (9) indicators are identified: six (6) indicators for tracking operations and three (3) indicators for evaluating the system's revenues.

Processing and monitoring a lengthy manual process is a hard task that requires specific personal skills from the involved staffs. Current productivity should be measured at every output point of every phase. The agents processing fines should have organizational skills and commitment to the task and to the time constraints. Nonetheless, Officers in charge of the Traffic Detachment should make sure that work is complete in due dates and remedy to delays in urgency. At every step of the process, staff should keep in mind that the mission is related to Traffic Safety, while an Employees Satisfaction Index should be created to know what type of motivational

actions towards staff might be required. Building human capabilities is a trait that is discussed in the Recommendation Part of this study.

Developing KPIs' is never complete without the identification of the related CSFs' (Osman & Anouze, A Cognitive Analytics Management Framework (CAM-Part 2), 2013). These factors, which are linked to the objectives of this study's mission, strictly aim to enhance the current system's performance. For every factor, a remedial measure is proposed. The measures constitute a base to build on and recommend changes to ultimately progress towards objectives and achieve the study's mission. The KPIs' and CSFs' tables complete each other and can be merged in one table.

Strategic Objective	CSFs	Measures
Reduce variability of input to شعبة معلو لـ اية تمـ	Centralize and automate the activities related to processing at Traffic Units	Measure the numbers of speeding fines issued by each Traffic Unit
Reduce variability in Lead Times to process fines between Traffic Units	Centralize and automate the activities related to processing at Traffic Units	Measure the Lead Times to notification for every Traffic Unit
Improve notification and collection in the first 15 days-to-pay	Introduce electronic and mobile payment	Measure the numbers of paid fines at every Traffic Unit by LibanPost, OMT and Contraveners
Evaluate the delivery-to-adress activity	Introduce Electronic and mobile payment. Weigh the potential of cancelling this activity by introducing e-tickets.	Monitor the efficiency of the delivery-to-address activity
Improve Traffic Court processing capacity of speeding tickets	Computerize work at Traffic Courts and link Courts to common database with Traffic Units. Make possible the E-payments to Court without having to show up in person to Court.	Measure the processing capacity with the current resources for each Traffic Court.
Improve Lead Times to receive Court notification by local police station	Reduce work load on Judges by improving the previous steps. Coordinate with Court employees and local police stations on possible other improvements.	Measure the capacity to process unpaid fines and objections to speeding fines by Judges and the notification times of Local Police Stations
Increase the number of paid fines in the first days	Introduce electronic and mobile payment. Evaluate the financial performance and hold accountable notification and collection partners.	Measure the revenues in the first 15 days-to-pay
Improve notification and revenues	Introduce electronic and mobile payment. Evaluate the financial performance and hold accountable notification and collection partners.	Measure the revenues from the delivery-to-address collection
Improve revenues collection at Traffic Courts	Introduce electronic and mobile payment. Evaluate the financial performance and control costs. Link the payment of yearly mechanic fees to the payment of speeding fines.	Measure the revenues at Traffic Courts

Table 18: Critical Success Factors and Measures for improving operations management and revenues.

Some success factors are repetitive. The simple reason is that changes

advocated to the current processing system will affect several activities and bring

improvements in both major axes of tables 17 and 18, which are: Operational efficiency

and financial performance. These success factors are: the centralization and automation of the speeding tickets issuance process, the electronic and mobile payment, the creation of a common database for all Traffic related institutions, and the creation of a link between paying speeding fines and paying the yearly mechanic fees. The other important aspect of improvement is that any positive change to occur at the start of the process will benefit the whole chain.

F. Evaluation of public e-services related to driving fines

The assessment of the speeding radar webpage on the ISF website was done using a set of replies on an open-ended question from a previous study conducted on the evaluation of e-government services in Lebanon (Osman, I-MEET, 2015).

Descriptives		N	Mean	Std. Deviation	Minimum	Maximum
BCG_Input	ألفوترة الالكترونية	506	.7419	.12780	.38	1.00
	تقديم طلب DSL	146	.7430	.13187	.52	1.00
	رسوم الميكانيك	41	.7533	.12039	.55	1.00
	مخالفات السرعة	439	.7902	.12725	.41	1.00
	وزارة الاقتصاد ـ البحث عن علامة تجارية	11	.7363	.16709	.50	1.00
	Total	1143	.7609	.13012	.38	1.00
BCG_Output	ألفوترة الالكترونية	506	.8519	.10967	.42	1.00
	تقديم طلب DSL	146	.8438	.10719	.61	1.00
	رسوم الميكانيك	41	.8910	.09720	.69	1.00
	مخالفات السرعة	439	.9186	.09153	.52	1.00
	وزارة الاقتصاد ـ البحث عن علامة تجارية	11	.8153	.13202	.63	1.00
	Total	1143	.8775	.10771	.42	1.00

Table 19: Table showing the number of respondents, mean and standard deviation related to an evaluation of efficiency (input) and effectiveness (output) of different e-government services. Yellow highlighted lines correspond to speeding radar fines.

BCG Matrix for e-Services in Lebanon
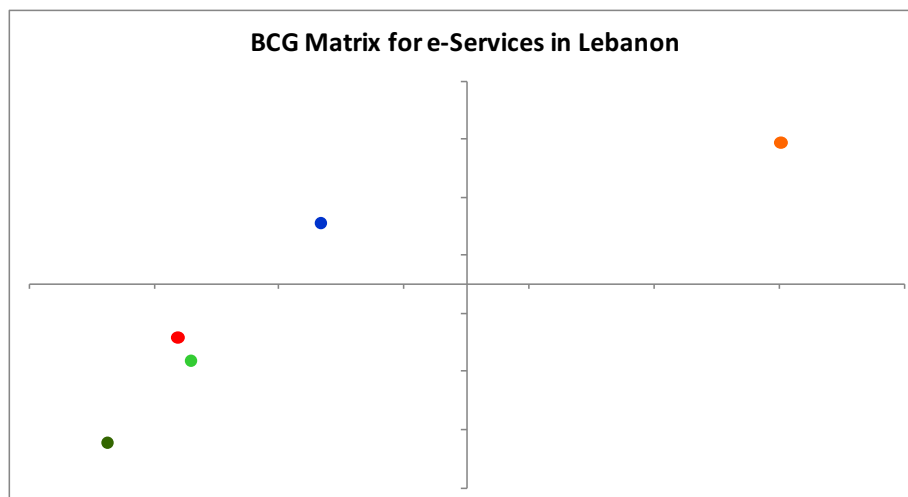
Figure 19: BCG matrix drawing the answers from the above table and showing the positioning of the five listed e-services in terms of efficiency (x-axis) and effectiveness (y-axis).

The BCG matrix shows that the e-services related to speeding radar fines are best positioned for improving the efficiency and effectiveness of the service. Using 148 comments received about the speeding radar webpage (Refer to Appendix 7), the study was able to evaluate qualitatively answers provided by AUB student drivers. Conclusions were drawn from the recommendations in the comments and categorized into four sets: Cost, benefit, Risk and Opportunity.

Summary of Measures/Actions that stem from comments	# of Answers	Evaluation Categories			
		Cost	Benefit	Risk	Opportunity
Re-design the ISF radar webpage and e-services	42	Medium	High	Low	High
Automate the ticketing process	28	High	High	Medium	High
Introduce e-payment service	14	Very low	High	Very Low	High
Benefit other institutions from experience	11	Null	High	Null	High
Increase publicity	8	Low	High	Very Low	High
Introduce notification systems by ISF	7	Low	High	Low	High
Create users' accounts for each driver	6	Low	Medium	Low	High
Reduce Lead Time to notification of speeding drivers	5	High	High	Null	High
Include history on radar webpage	5	Very low	High	Null	High
Secure the website and electronic data	5	Medium	High	Medium	Low
Develop mobile format or apps	4	Medium	High	Very Low	High
Modify the Traffic Act	4	High	Null	High	Null
Introduce a Hotline for agents and Contraveners to interact	2	Very low	Medium	Very Low	Null
Provide car image upon request	2	Low	Medium	Very Low	Null
Purchase speeding radars	1	High	High	Low	High
Introduce KPI's and CSF	1	Low	High	Null	High
Develop a webpage format that is cross-browser compatible	1	Very low	Medium	Null	Very Low
Introduce informational tips notifications	1	Very low	High	Null	High
Develop the interface between ISF and LibanPost	1	Very low	Medium	Null	Medium

Table 20: A qualitative study of the measures and actions listed that were drawn from the recommendations of drivers that filled the questionnaires. Each conclusion was then evaluated in terms of Cost, Benefit, Risk and Opportunity. The levels of each category go from Null to High.

The above table highlights the ten most popular recommended measures in red. The most popular recommended improvement measures are: re-designing the webpage and providing more information and services on it, automating the ticketing process to include email notification and e-tickets and introducing e-payment and mobile payment. Almost all the listed measures are logical and attainable. The twelfth recommended measure, however, which is to modify the Traffic Law in order to increase speed limits is the only unreasonable point in the list. Some actions can be implemented with time and might be introduced at later stages, like the measure positioned at number four, which recommends to share experiences with other public institutions. These results are used in the Part - "Recommendation" of this study to help define a results-based solution and draw an improved processing system.

G. Assessment of an on-going improvement project

The Traffic Division (شعبة المرور), part of the General Staff (هيئة الاركان), is tasked with preparing studies and providing consultancies to the General Chief of the Internal Security Forces, in all matters related to Traffic Engineering and Management (Biblio ref.). It should be noted that Traffic Detachments (مفارز السير) are under the command of the Chief of Police (قيادة الدرك). The Traffic Division have an on-going project of centralization of the speeding ticketing process; which means that the process management will shift from sixteen (16) Traffic Detachments under Police Commandment (refer to Appendix 4) to one speeding ticketing center (refer to Appendix 5).

The project is financed by grants and the center has yet to be equipped. Also, the required human resources and operations capacity haven't been defined yet. The proposed system includes the following improvement themes:

- Centralization of the ticketing process with data from speeding radars stored in one place.

- Synchronized data with the main ISF server and the TMO server. The ISF server includes the Radar Webpage, vehicle judicial report and the car owner judicial record.

- Additional Payment processing: e-payment on Official Webpage and Banks.

The detailed activities at the processing center, as described in the Traffic Division plan, go successively as following:

- Each Traffic Detachment keep on operating speeding radars as it currently does. The operator uses an internet connection to download the flashed cars photos to the processing center server.

- The system archives one copy of the flashed car photo and sends another copy for processing.

- An operator processes the information related to the car and sends it to a first reviewer, who then sends it in turn to a General Reviewer.

- The General Reviewer then sends the fines to the Chief Center for approval.

- The approved speeding fines are printed. The information is sent to a general database managed by the ISF, which contains all the fines' information.

- After that, the process continues as-is with LibanPost and OMT notifying drivers and Traffic Courts processing unpaid fines.

This improved plan will help to reduce variability and achieve a feasible flow rate based on an average expected input. The new system will also help decrease Lead Times to notification and increase revenue collection by adding e-payment methods and points of payment at Banks. However, several observations that stem from the above evaluations of the different phases can be made:

- Although the system has been centralized, it has not been made fully automated. The human intervention in the issuance of the speeding fines is still preponderant. Therefore, the risks of error, favors and delays have not been eliminated.

- Traffic Detachments have to download the flashed cars photos from their workstations onto the processing center's database using an internet connection, with the risks of human error and delays.

- Database link to Traffic Court isn't clear.

- The purpose of delivering printed ticket to address through LibanPost when e-tickets, online payment and notification and payment through banks will be available.

- Other issues that need to be clarified are listed here:

  o Possibility of notifying Contraveners, using the ISF web server, by email and SMS.

  o The center's processing capacity, number of employees, work shifts and organization chart.

  o The photos storage time, capacity needed and cost.

- o   Linking the speeding fines to the TMO server.

- o   Automating the speeding fines upload to the ISF website.

The improved processing project is a crucial step for Security Forces and drivers. The new system must have Performance Indicators to monitor the work and assess improvements, and ultimately be affecting Road Safety in Lebanon.

CHAPTER V

RECOMMENDATION

A. Summary of identified Risks and Problems

Endorsing solutions to the speeding ticketing processing system is quite reasonable if they constitute answers to: risks and problems identified in the previous Research and Results Part, financial shortfall from the current process.

To recap the previous Part of this study, the following list summarizes by point the list of risks and problems that were identified in the current processing system:

- Improper and insecure Data storage.

- Variability in processing capacities and Time for the 16 Traffic Detachments working independently.

- Risk of Data loss.

- Predictable input of flashed speeding cars.

- Manual processing of speeding tickets.

- Risk of favors and unethical behavior.

- Risk of losing tickets and/or damage to paper.

- Lead Time to notification of Contraveners.

- Time-to-upload and Time-to-cancel from the ISF Radar webpage.

- Double SMS notification by LibanPost and OMT.

- Limited methods of payment (OMT, LibanPost, and in-person at the Traffic Detachment) and Money Stamps as the only acceptable payment proof.

- Delivery-to-address time by LibanPost.

- Time-to-transfer tickets (White Tickets) to Traffic Courts.

- Traffic Court processing capacity of unpaid tickets and objections.

- Time-to-Notify Contravener by local Police stations.

- Indirect cost of physical presence and Time at Traffic Court to settle fine.

B. Design Guidelines for an improved processing system

The question that this study tried to answer is "does the speeding ticketing system meet Traffic Safety objectives". In continuity with the CSFs' (refer to Part "Results") and replies to the questionnaire on how to improve the system from the drivers' point of view (refer to "Evaluation of e-government services" chapter), design guidelines were written. The following list of points shall constitute guidelines for any to-be processing system in response to improving the current as-is system:

- Centralized processing center for speeding tickets: radar content shall be sent using a wireless connection at the end of the spotting mission for the existing radars covering all national territory. All future acquired radar shall be equipped with wireless technology for instant image sending.

- Speeding ticketing server at the center shall be linked to:

  o Traffic Management Organization (TMO/النافعة) server.

- ISF Main server that includes the vehicle and the owner's judicial reports (النشرة) and the Radar Webpage that is managed by the ISF web team (شعبة المعلوماتية).

- قيادة العمليات المركزية and the police border units at the Lebanese border checkpoints to control cars with foreign plates that have been flashed speeding.

- Traffic Courts.

- The payment of the yearly Mechanic fees shall be linked to the settlement of the speeding tickets; whereas a car owner shall only be able to regulate his Mechanic situation after having settled his speeding tickets.

- The center shall have a Hotline and Front desk for manual review of fines.

- The center shall be able to produce the car image if requested by driver or Traffic Court.

- The car image shall be kept in storage till payment of the fine.

- The ISF webpage shall be re-designed and shall include the following information and links:

  - The following information regarding the violation shall only appear after a set of security questions for checking: plate number, date and location of flashing, payment status, history of speeding fines and link to car image.

  - Printable e-tickets.

  - E-Payment option.

- Type 5 violation are sent directly to local Police Stations and are processed by Traffic Court.

- The improved system shall be automated to enable notification within few hours of radar flashing using the current radars.

- Violators shall be notified that they have been flashed by SMS sent from the processing center.

- The contraveners shall have the following payment method options: E-payment through website, mobile payment with the mobile format of the webpage, banks and ATM machines, LibanPost and OMT.

- The delivery-to-address of tickets shall be cancelled.

- The Time-to-pay from notification date shall be extended to not less than ninety (90) days.

- Traffic Courts shall be equipped with desktops and linked to the processing center database.

For reference, the process flowchart of the proposed automated processing center is drawn and attached as Appendix 8.

C. Cost breakdown for a centralized and automated processing system

The below Figure 17 shows a list of components (hardware and software) and human resources required to set up an automated center for processing speeding tickets based on the study's design guidelines. The center's location is considered to be in the Traffic Management Center, as already planned by the Traffic Section; therefore, no leasing cost was added. No investment in the purchase of new radars was added since such an investment can be costly and can be studied at future stages. It should be noted that previously recommended options like "creating personal accounts for every driver" were not considered at this stage, but should definitely be integrated in future

governmental e-services enhancement plans. Also, this plan doesn't include any

spending on advertising and awareness, although this point figured in the top ten list of

improvement recommendations by users.

Components:	Hardware (in USD)	Software (in USD)	Human Resources	Development Payroll(in USD)
Speeding radar	Existing			
Photo uploader			1	3000
Photo receiving service		3,000	1	3000
ISF Server:				
Recognition engine		Open ALPR	6	18000
Central Database	50,000	5,000	3	9000
SMS gateway		2,000		24000
Portal Services		5,000	8	
Network equipment at processing center	15,000			
Hotline and Frontdesk	2,400		1	3000
Traffic Court Server:				
database integration				
Portal Services	10,000	5,000	6	18000
E-payment				
Network equipment at Traffic Court	15,000			
Traffic Court Desktops	10,800			
Total Costs	103,200	20,000		78000
Final Total Cost				**201,200**

Figure 20: Cost breakdown for setting up a central automated processing center; including costs of hardware, software and human resources calculated in "developer * month" with a monthly salary estimated at 3,000$/developer.

Extra measures can be added to the automated system, like a Disaster Recovery

Plan (DRP) for the center's server, Traffic Courts server and the software's. The cost of

these plans is estimated as following:

Disaster Recovery Cost(in USD) :	
Disaster Recovery Plan (DRP) for ISF	65,000
Disaster Recovery Plan (DRP) for Traffic Court	25,000
Disaster Recovery Plan (DRP) for softwares	20,000
Total DRPs'	**110,000**

Figure 21: Estimated costs for Disaster Recovery Plans, which are optional and add up to the final cost of new system.

The operational costs of running the system on a yearly basis were estimated at

20% of the initial investment cost, along with yearly Telecom subscriptions for 3G

connection, SMS bundle and a 4-digit Hotline. The operational costs include the monitoring of performance indicators (KPIs') by Data Analysts working at the center.

OpEx(yearly cost in USD) :	
Operations Cost estimated at 20% of Capex	40,240
3G subscription plan	7,200
SMS bundle of 15,000 messages	2,000
Hotline 4-digit subscription	2,000
Total operational costs per year	**51,440**

Figure 22: Estimated operational costs per year based on the initial total cost of figure #, without a Disaster Recovery Plan.

It is interesting to note that the estimated cost of this plan with one year of operations that will include testing and regulating, which is not less than 250,000$, is less than the estimated financial shortfall of more than 287,000$, at the Baabda Traffic Detachment (refer to Chapter "Value Analysis of the process").

CHAPTER VI

CONCLUSION

A. Alignment with Road Safety

The fundamental mission of this study was to re-design the speeding tickets process according to a shared value model between the Internal Security Forces responsible for Traffic Safety and Drivers. The results indicate that most drivers (28%), who responded to a questionnaire about the ISF Radar Webpage, wished for this e-service page to be re-designed and to include more information and possible actions, like e-payment. The results also showed that drivers (19%) wished for the system to be automated, in a way that would reduce the Lead Time to notification of the speeding drivers and provide an e-ticket available on the webpage. More than 10% of respondents explicitly recommended to add the e-payment option. Other recommendations from drivers were to increase publicity for the webpage and to benefit other public institutions from this experience in a way to spread e-services in Lebanon, which would be beneficial to citizens and to the government. The proposed recommendation was in line with drivers' recommendations and with the risks and problems identified in the evaluation of the current ticketing process. The suggested processing system would be centralized and fully automated in a way that would improve the punishment's effectiveness on drivers and guarantee that there would be no financial shortfall in the revenue collection activity. On an interesting note, the re-designed system (set-up, testing and implementation) would cost around 250,000$;

which is less than the financial setback from the current processing system at the Baabda Traffic Detachment alone, estimated at 287,000$.

The principal objectives of this study were to evaluate the existing processing activities, estimate the economic impact and determine the extent to which the current fining process impacted the drivers' speeding behaviors. A series of interviews were conducted to gather information and figures from the different stakeholders.

The current process was divided into three processing phases. The first phase is related to processing tickets at the Traffic Detachments, which leads to the drivers' notification about their speeding violations. The problems and risks that were identified during this phase were: improper and insecure Data storage with the risk losing Data, variability in process due to the fact that 16 Traffic Detachments work independently, predictable input of flashed speeding cars (informal agreement within the Detachment to limit flashing due to capacity constraints and manual work), manual processing of speeding tickets with the risk of losing tickets and/or damaging paper, risk of favors and canceling fines for personal reasons, delays in processing which results in long lead times to notify drivers and a long time to upload fines on the ISF Radar webpage.

The 2nd phase is the work of LibanPost and OMT for money collection and distribution of the fines yellow cartons. Data from a real driver's case helped to show the time it took to deliver the fine at the address of the Contravener. Due to the length in time of the current activity, it can be replaced with the online e-ticket. Another fact to note was that the Contraveners receive two SMS notifications, one from LibanPost and one from OMT. As for the payment methods, there are currently only three possibilities, which are through LibanPost or OMT, or at the Traffic Detachment directly. The unpaid tickets and the list of paid tickets are transferred to Traffic Courts for processing.

The 3rd phase is processing the unpaid tickets, objections, and the Type 5 violations at the Traffic Courts. The problems that were identified from the interview and the data provided by the Court are: the under-staffing and the manual processing of fines which are limiting Courts capacity and creating delays, as well as the notification process that is handled by local Police stations which is unknown but assumed to be lengthy. The risk of losing tickets or damaging the papers also exists in Traffic Courts. Another identified activity that has a high effect on speeding drivers is the indirect cost incurred from the Contraveners' mandatory physical presence at Traffic Court and the time that he has to spend to ask for a reduction of payment and/or to settle his fines.

It was estimated that only 50% of the issued speeding fines are collected during the first 15 days, following the SMS notifications. This percentage was based on data collected from the Baabda Traffic Detachment only, where more than four months of work on flashing speeding cars are delayed in the process due to their limited capacity and the financial shortfall was estimated at 287,000$, as mentioned before.

In the current situation, and with all of the processing activities being done manually, the good running of the system depended on: The role of Leadership at the Traffic Detachments and Courts, which is to motivate and monitor work and make sure it is done within the proper time, and the workers role that is to make sure that delays are not accumulating and process them fines while keeping in their minds the higher mission, which is to improve Traffic Safety. On the other hand, Key Performance Indicators (KPIs) were developed, that ought to be used to monitor the operational and financial aspects of the process. These KPIs' would also apply to the re-designed system that would be monitored by Data Analysts, in case it is implemented. Critical Success Factors (CSF) were also developed to provide the list of measures that can be

taken in order to improve the existing process and were also reflected in the

"Recommendation" Part of this study.

B. Effect of Legislation and Technology

As noted in Part Background, the full implementation of the Traffic Act, along

with the introduction of government E-payment legislation and the increase in the

number and types of radar shall have a great effect on how citizens drive and how they

perceive the government's Traffic Safety programs. For example, the Abu Dhabi Traffic

Police ticketing process is able to instantly message drivers and inform them that they

have been caught speeding and fined, which is the best way to change behaviors. The

large number and the different types of radars deployed on the roads in France helped in

reducing the average speed by 10 km/hr., while it was a crucial factor in reducing the

number of road casualties in the UAE from 29 (per 100,000 population) in 2005 to 10.9

in 2013. The Park Meter company in Beirut and its Greater Area is another example of

how a public-private partnership has grown to succeed in its parking mission, due to

several factors, which include: An electronic database with E-payment possibility on the

website, the link between payment of yearly Mechanic fees and the settlement of the

Park Meter fines and a Hot Line to help drivers sort out their problems without having

to make trips and bear indirect costs.
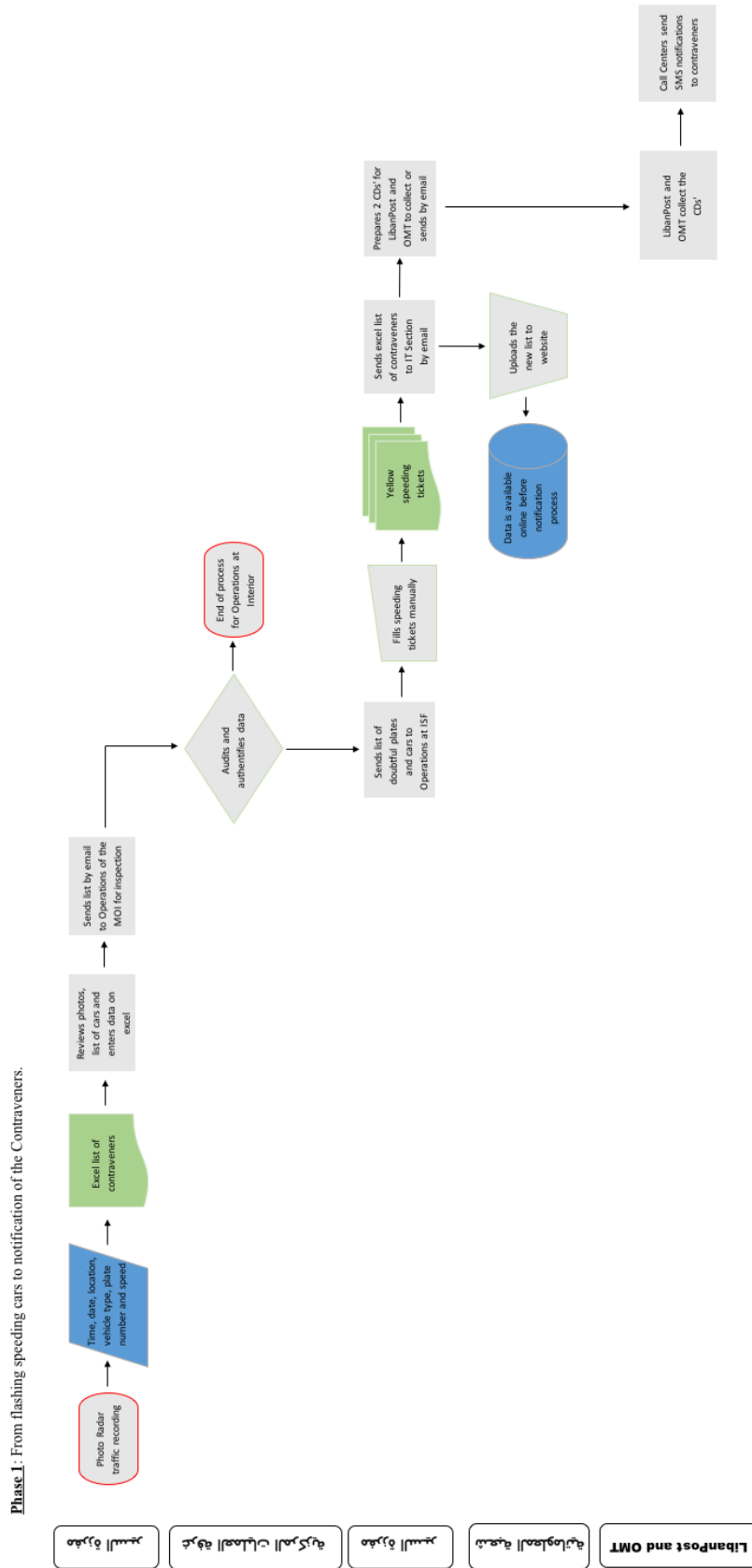
C. Limitations of the Study

This retrospective study of Speeding Radars Ticketing Process has a number of

limitations. The first constraint is that there are sixteen (16) Traffic Detachments and

nine (9) Traffic Courts operating independently, and for this study, only two (2) Traffic

Detachments and one (1) Traffic Court were interviewed. Although the data provided during the interviews was enough to make strong assumptions and validate these points, an extensive research on a larger number of Traffic Detachments and Courts can be undertaken for more precise figures. For example, the data used in the "Value Analysis of the Process" Chapter was enough to make an estimate of the financial shortfall from the process at the Baabda Traffic Detachment. However, there are still fifteen (15) other Traffic Detachments where the same exercise can be done.

Similarly, some questions remained without answers, like "what are the specifications of the existing radars", which would have helped in the "Recommendation" Part to know if the equipment can take on a 3G or internet connection, and the time to deliver the unpaid tickets from Traffic Detachments to Traffic Courts. Another potential limitation is that the Ministry of Finance wasn't interviewed about the distribution of monetary stamps, its role in revenue collection from speeding fines and the consideration of generated revenues from speeding tickets as a Lump Sum, instead of a precise monetary figure that corresponds to the exact number of paid tickets. The proper assessment of the economic impact should involve the Ministry of Finance and شعبة الشؤون الإدارية; two stakeholders that were not interviewed in this study. A last limitation, related to the "Assessment of government E-services related to speeding fines" Chapter, is that questionnaire respondents answered on "how to improve the current existing process". It would have been interesting also to ask people in the questionnaire if the current process has had any impact on their speeding behavior. The questionnaire could have been sent to a broader age range of drivers; whereas in this study, all respondents were university students.

APPENDIX

I. Process Flowchart at Phase 1

Phase 1: From flashing speeding cars to notification of the Contraveners.

Photo Radar traffic recording

Time, date, location, vehicle type, plate number and speed

Excel list of contraveners

Reviews photos, list of cars and enters data on excel

Sends list by email to Operations of the MOI for inspection

Audits and authentifies data

End of process for Operations at Interior

Sends list of doubtful plates and cars to Operations at ISF

Fills speeding tickets manually

Yellow speeding tickets

Sends excel list of contraveners to IT Section by email

Uploads the new list to website

Data is available online before notification process

Prepares 2 CDs' for LibanPost and OMT to collect or sends by email

LibanPost and OMT collect the CDs'

Call Centers send SMS notifications to contraveners

مكتب السير

غرفة العمليات الداخلية

مكتب السير

قسم المعلوماتية

LibanPost and OMT

II. Process Flowchart at Phase 2

Phase 2 Revenue Collection Processes.

III. Process Flowchart at Phase 3

Phase 3 Processing speeding tickets at Traffic Courts.

IV. Actual System Flowchart as provided by Traffic Section
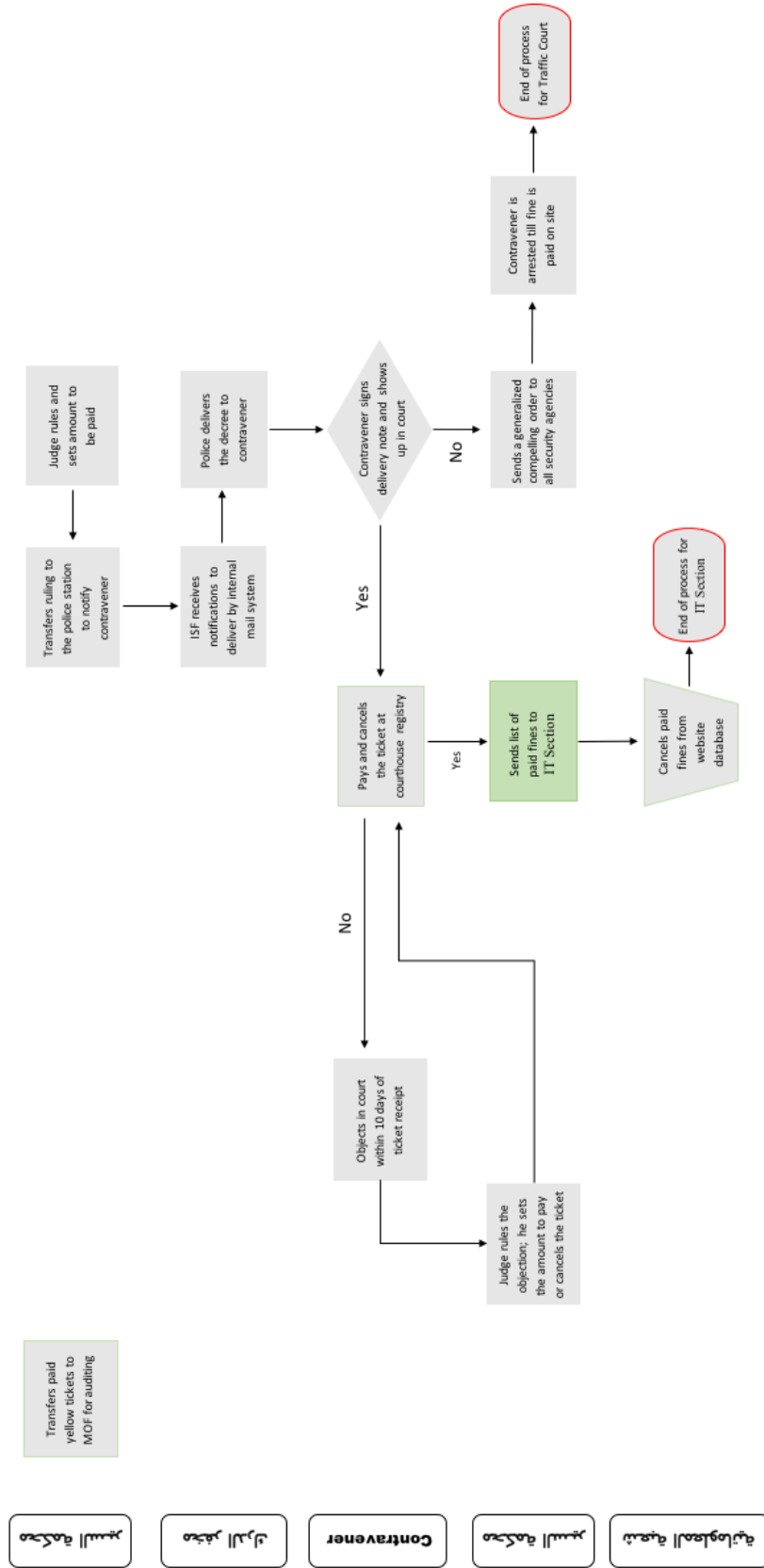
V. Re-designed centralized processing system, as presented by Traffic Section

مسار / آلية عمل محاضر السير ضمن مركز اصدار و معالجة المحاضر (ادارات السرعة)

100

VI. Radar Speeding Ticket Format manually filled at Traffic Detachments

طابع بريدي

طابع غرامات السير

رقم 113525

المرسل إليه

اقطع لفترة البطاقة وفقاً للخط العامودي

تاريخ تنظيم المحضر

بطاقة جوابية

محضر ضبط

رقم مفرزة 113525

قوى الأمن الداخلي

سرية أو فصيلة سير في القطعة سير

الرقم

منظم المحضر الرسمية أثناء الخدمة

رقم

رقم

شاهدنا في محلة

نوع المخالفة

ماركة

الـ

لون

رقم

هوية المخالف

الاسم

اسم الأب

الشهرة

اسم الأم

من أهالي

وسكان محلة

شارع

حامل إجازة سوق

لبنانية

خصوصية

عمومية

رقم

التاريخ

الساعة

الشارع

القطعة

قانون السير المادة

التابعية

سنة الولادة

بلدة

ملك

إفادة مخالف

لا يملك المركبة

يملك مركبة

أبلغ المخالف أن بإمكانه دفع الغرامة المختصة وقيمتها

ل.ل.

بموجب طابع غرامات السير خلال عشرة أيام من تاريخه

توقيع المخالف

توقيع منظم المحضر

101

VII. Comments collected from an open-ended question on how to improve the actual speeding radar e-service on the Radar Webpage on the ISF Website

| #	Comments collected from an open-ended question on public e-services related to driving fines and how to improve the website interface
1	in order for the citizen to save time and effort and to benefit from using the internet, all the citizens must follow the development in the country as well as benefit from the technology, communication technology and finance
2	The citizen finds that the government should provide more of such service especially through email since the citizen is still obliged to go the offices to finish his paperwork
3	The citizen finds that there are still thing missing in the website thus it can improve
4	The citizen hopes that the service provides more information
5	The citizen needs the internet connection to access all the details that he needs
6	The citizen recommends increasing the speed
7	The citizen recommends linking the service to the post office to help the citizens more
8	The citizen recommends modernizing the service more and making it more economical
9	The citizen recommends providing more clarifications and detailed information
10	The citizen recommends providing more detailed information
11	The citizen recommends providing previous information
12	The citizen should know immediately about the penalty when it is issued
13	The design of the website should improve to be more user friendly
14	The service could provide more information
15	The service could provide up to date information
16	The service needs to be update more frequently
17	The service needs to improve
18	The service needs to provide more information
19	The service needs to provide more information.
20	The service needs to update
21	The service provides the citizen with required information thus it saves him time
22	The service should be advertised more so that the citizens could trust it more.
23	The service should provide more clear information
24	The service should provide more detailed information
25	The service should show how many citizens visited the website to encourage other citizens
26	The service would be better if they provide information in English

27	A mobile version of the website should be created
28	The citizen should be informed once a speed ticket is issued
29	The service needs to update its information regularly
30	Each citizen should have his own account so that he would be the only one able to access the account in order to use supporting documents
31	The citizen recommends paying online
32	The citizen recommends paying online through credit card
33	The citizen recommends providing a reference number for the him to follow up with
34	The citizen wants the service to be more secure
35	The government should provide other services for other sectors
36	The service could provide more elaborated process.
37	The service needs to be sent to each citizen as message on his mobile
38	The service needs to be updated regularly.
39	The service needs to update its information more frequently.
40	The citizen prefers that the service covers downloading information on the smart phone
41	The citizen recommends providing new services
42	The service could notify the citizens
43	The service should allow the citizen to update his file and send the penalty directly to his address
44	Government should energize such services more to increase its efficiency
45	I recommend adding a feature where the citizens can report the government employees who asks for bribes and do not allow the citizens to finish their work without a middleman
46	I recommend that the service includes a reference number and the time of the ticket
47	If the government can encourage citizens to use such services, they may benefit a lot from it
48	The citizen hopes applying this service to other sectors
49	The citizen hopes increasing the centers for paying services
50	The citizen hopes providing more detailed information
51	The citizen hopes that all government agencies starts using electronic services
52	The citizen hopes that he starts receiving pictures of the car penalties through messages or WhatsApp
53	The citizen hopes that the service allows him to finish all his paperwork's to save him time and to avoid fraud and bribes
54	The citizen hopes that the service include more clarifying images
55	The citizen hopes that the service updates its information faster
56	The citizen hopes that the speed increase

57	The citizen hopes the service regularly update its information
58	The citizen hopes the service send information to citizens through messages
59	The citizen hopes to pay using credit cards
60	The citizen is asking for more security or privacy
61	The citizen is asking if the service could provide more information
62	The citizen needs this service to be implemented to other sectors to save time and money
63	The citizen prefers a website that downloads in a faster way
64	The citizen prefers adding speed radars so citizen would drive slowly
65	The citizen prefers the information to be updated more regularly.
66	The citizen prefers to be able to pay online
67	The citizen prefers to see all previous transactions
68	the citizen recommends activating electronic signature
69	The citizen recommends adding a box that shows whether the penalty was paid or not
70	The citizen recommends allowing the citizens to add their numbers to send them message in case of a penalty
71	The citizen recommends applying the service on mobile phones
72	The citizen recommends changing the color of the service
73	The citizen recommends changing the font because it is hard to read
74	The citizen recommends decreasing the fees
75	The citizen recommends decreasing the time needed to obtain information
76	The citizen recommends deleting the penalties after the citizen pays for them
77	The citizen recommends designing the website in a better way
78	The citizen recommends ensuring the electronic safety
79	The citizen recommends implementing this service to other government sectors.
80	The citizen recommends informing him when a penalty is issued through email or message
81	The citizen recommends paying online
82	The citizen recommends providing direct chat between employees and citizens
83	The citizen recommends providing more information
84	The citizen recommends providing more information
85	The citizen recommends providing more information if the law permits
86	The citizen recommends providing the elections electronically
87	The citizen recommends reminding the citizens to put the seatbelts
88	The citizen recommends sending a copy of the radar picture with the ticket to ensure honesty and occurrence of the penalty

89	The citizen recommends that the service provides more information
90	The citizen recommends to improve the quality and appearance of the website
91	The citizen recommends to notify the users when a ticket is issued
92	The citizen recommends updating the information faster
93	The citizen recommends updating the information in a faster way
94	The citizen recommends updating the information regularly for the citizen to follow up
95	The citizen recommends updating the service to follow up with development
96	the citizen wants the service to include more information
97	The citizen wants the service to provide other information
98	The citizen wants the service to provide information in a faster way
99	The citizen wishes implementing the service to all government sectors
100	The citizen wishes looking at all previous information
101	The citizen wishes that the information to be updated
102	The government should advertise the service more and through different methods
103	the government should ensure that the service is cross browser compatible
104	The government should hire employees with high qualifications in IT
105	The government should implement such services to all sectors
106	The government should make sure that the service is being implemented
107	The government should provide the citizens with more electronic services to simplify the citizen's work
108	The information that the service provides need to be more up to date to avoid confusion and wasting the citizen's time
109	The information that the service provides should be regularly updated and audited
110	The post office should deliver the speed ticket to the citizens in a faster way
111	The service can allow the citizen to pay using credit cards
112	The service could be implemented on mobile phones
113	The service could inform the citizen through text messages about any update or information he may needs
114	The service could provide more detailed information
115	The service must provide hotline for when citizens encounter problems
116	The service needs more advertisement
117	The service needs to be designed in a more user friendly way
118	The service needs to provide more information
119	The service needs to update the information faster

120	The service prefers to be able to pay through the service
121	The service should allow the citizen to use credit or visa cards to pay his bills
122	The service should allow the citizens to specify their names and numbers to notify them in case of penalty
123	The service should be advertised more so that more citizens would know about it
124	The service should decrease the fees
125	The service should include more information
126	The service should inform the citizen in case he got a new ticket so the citizen would print the ticket and bring it to the office
127	The service should notify the citizen in case something concerns him occur.
128	The service should provide each citizen with a private account to sustain privacy.
129	The service should provide information about the date, time and place of the penalty
130	The service should provide more detailed information
131	The service should update its information regularly
132	The service would be better if it provides more information
133	The speed of the internet should increase
134	the speed radar should link with the service to provide information immediately
135	The website should provide with the speed ticket the speed radar photo, where it was spotted and the speed limit in that area in order to avoid any doubt
136	The citizen finds that the service needs to be faster even though the database is big.
137	The citizen hope the service allows him to look at previous information
138	The citizen hopes providing all international services
139	The citizen prefers to be able to pay through more than one method
140	The citizen prefers to view previous information
141	The citizen recommends focusing more on the security level
142	The citizen recommends notifying him through email
143	The citizen recommends providing faster and easier payments methods
144	The citizen should register with his car number
145	The service could be developed to include all kind of fines related to cars
146	The service should be advertised more
147	The service should provide a connecting system that would allow the citizens to benefit from each other's
148	The citizen wants the information to be regularly updated

VIII. Centralized and automated system for processing speeding tickets
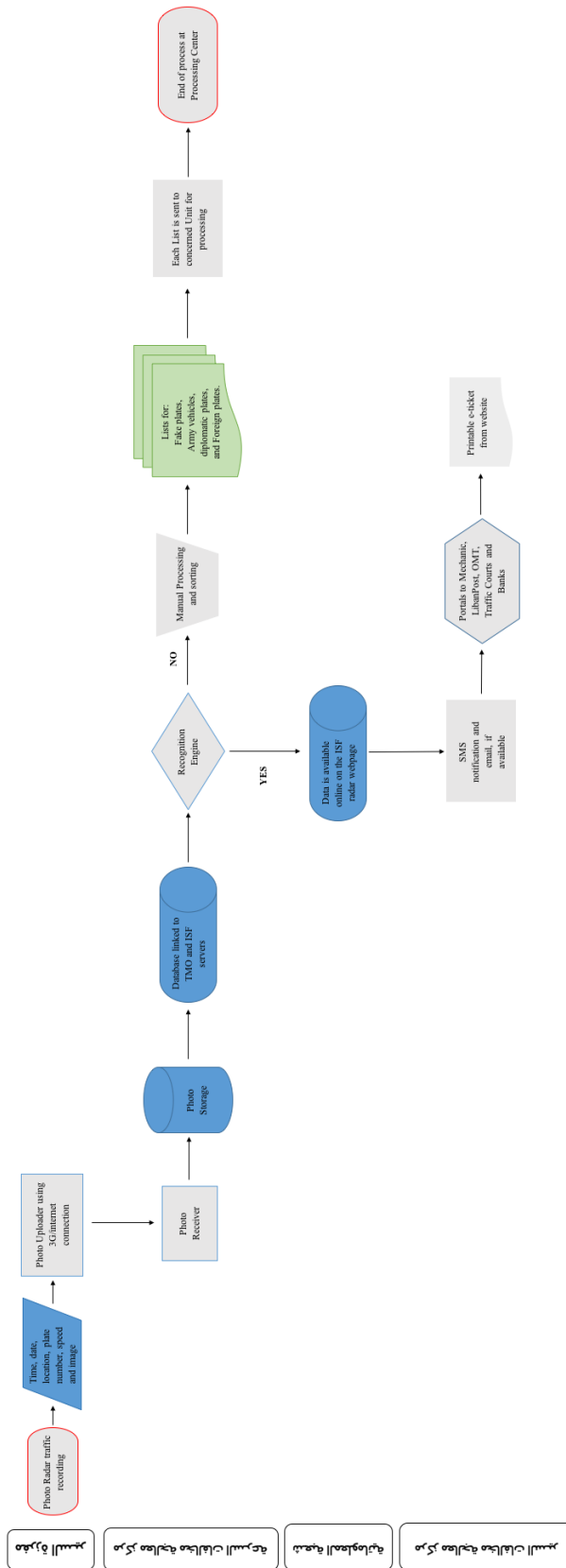
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