UNSW Business School/
Information Systems and
Technology Management

GROUP ASSIGNMENT COVER SHEET

Group (No./Name): Group 23

Course: INFS3604

Tutorial time: Thursday 9am

Assignment Title: Group Assignment Part B

Due Date:

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VALUE-ADDED MATRIX

The assessment of the as-is process was initiated by developing a value-added matrix.

Parent Process	**Step**	**Performer**	**Classification**	**Justification**
1	Park car	Customer	NVA	This step is essentially a handover; hence it does not add value to the customer or business
1	Collect number	Customer	NVA	This is a waiting step that adds no value.
1	Conduct Insurance check	Receptionist	BVA	Ensures check is conducted on registered vehicle. Beneficial to the inspection firm and the government.
1	Make insurance payment	Customer	NVA	This step does is a defect in the process, wasting time and not adding value to the process.
1	Make inspection payment	Customer	BVA	This adds financial value to the business, contributing to their income.
1	Provide inspection form and number	Customer	NVA	The customer bringing inspection form to the inspector is a motion.
1	Move car to inspection bay	Customer	NVA	Unnecessary transportation of vehicle
1	Wait for number (at inspection hall)	Customer	NVA	This is an example of waiting.
2	Change number on monitor	Base 2 Inspector	BVA	Assists the inspector in finding customer, allowing for a more efficient process.
2	Instruct customer to leave keys	Base 2 Inspector	BVA	Ensures customer waits in correct area and does not disrupt inspection.
2	Check keys	Base 2 Inspector	BVA	Ensures inspection can be carried out by inspector.
2	Retrieve keys	Base 2 Inspector	NVA	Motion carried out by inspector.

2	Examine Registration Papers	Base 2 Inspector	BVA	Briefs inspector on the car itself, which will ultimately assist in the effectiveness and efficiency of inspection process.
2	Complete Base 2 Checks	Base 2 Inspector	VA	Inspection of these component is what the customer is paying for.
3	Move car to Base 3	Base 2 Inspector	NVA	Unnecessary transportation of vehicle.
3	Check brakes	Base 3 Inspector	VA	Inspection of this is what the customer is paying for.
3	Check Base 4	Base 3 Inspector	BVA	Assistance to the inspector at Base 4 helps complete inspections faster.
3	Assist Base 4	Base 3 Inspector	BVA	Assistance to the inspector at Base 4 helps complete inspections faster.
3	Move to Base 4	Base 3 Inspector	NVA	Unnecessary transportation of the vehicle.
4	Raise vehicle	Base 4 Inspector	BVA	Ensures proper components can be inspected with minimal strain on inspector.
4	Complete Base 4 Checks	Base 4 Inspector	VA	Inspection of component is what the customer pays for.
4	Read Outcomes	Base 4 Inspector	VA	Unnecessary transportation of files.
4	Collect vehicle and documents	Customer	NVA	Waste of time and motion for the customer.
5	Collect completed documents	Receptionist	NVA	Unnecessary motion of receptionist.
5	Record reports	Receptionist	BVA	Recording of reports is required by the government, hence necessary and a valuable step for the business.
5	Review Reports	Manager (Vehicle Dep't)	BVA	This check ensures the accuracy of reports recorded and quality of receptionist's output.

5	Transmit records to regulating agency	Manager (Vehicle Dep't)	BVA	As Frumherji is subject to strict regulations and monitoring, completing this step adds value to the business in maintaining their credibility and ability to comply with regulations.
5	Correct report errors	Reception Supervisor	BVA	Required by the business to be completed every day and ensures that the records are correct and comply with government standards.

ISSUE REGISTER

After reflecting upon the Non-Value Adding activities in the matrix and considering their impact on Frumherji's as-is business process, we have compiled 11 issues that can be found within the case. Most of the assumptions made were within the case provided, while others were assumed based on research. After reviewing the issues, we then determined the feasibility of resolving each issue and the impact of a solution regarding time and financial impact on the business. This was done through the creation of a PICK chart (attached in next section), allowing us to effectively evaluate feasibility and select a subset of issues for further analysis and redesign of Frumherji's processes.

Issue Name/Number	Explanation	Assumptions	Qualitative Impact	Quantitative Impact
1. Movement to and from the inspection bay after parking car.	Owner parked car in front of the reception or inspection hall prior to entering reception. If parked in front of reception, they were required to move their vehicles to		Unnecessary motion between the reception and inspection bay causes frustration in customers and delays in getting to the inspection bay.	
2. Long wait at reception for service	Customers waited too long at the reception desk, partly due to receptionist taking on many tasks and also	Theoretical cycle time = 2 minutes to serve a customer. Cycle time = up to 16 minutes	Customer frustration is a likely impact of this process, due to wait times well exceeding the amount of time it	Processing 75 inspections per day costs $540/day in wages, whereas work completed constitutes

	due to volume of customers.	Wages spent on this task: $0.90/customer. Actual wages spent on this task: $7.20/customer	takes to complete the task. Potential loss of customer to Adalskodun.	$67.50 worth of work. Excess wages paid due to delays equates to ($140400 - $17550) $122,850 p.a.
3. Vehicle owner turned away due to lack of insurance fee payment	Receptionist uses the database to determine the status of customer's insurance fee payment and vehicle tax. Vehicle owners are turned away if payment is not made.	1.7% of customers are turned away due to this. Customers will wait up to 16 minutes to be turned away.	Refer to Issue #2.	Cycle time is increased to 16.27 minutes per transaction (using a rework loop to calculate). 1.7% of transactions are redundant due to the need to rework. As this adds an extra 20.75 minutes to processing time for the day, Frumherji misses the opportunity to serve an additional customer per day or make an extra $16,900 per year.
4. Long wait to get served at Base 2	Customers waited for a long period of time in the inspection bay.		Refer to Issue #2	
a) Customers taking keys to waiting lounge with them	Customers would forget to leave keys with inspector. inspector would have to move to and from the waiting lounge to retrieve them.	This activity would take up 5 minutes of an inspector's time. Extends inspection by 5 minutes. Theoretical cycle time at Base 2 is 4 minutes, actual cycle time being 10 minutes.	Refer to Issue #2	5% of occurrences is 3-4 inspections per day. Therefore 15 minutes per day is spent in motion retrieving keys. Waste of opportunity to conduct another inspection (Refer to Issue #3)

		Retrieval of keys occurs in 5% of cases		
b) Customers falling asleep in their cars	Long waits for number to be called meant customers fell asleep in their cars. Inspectors would need to go and wake up customer in parking lot.	Refer to Issue #4a	Refer to Issue #2	Refer to Issue #4a
c) Customers driving past Base 2	Lack of signage indicating where to stop car would cause delays as it would disrupt other inspections and the inspection flow.	Refer to Issue #4a	Refer to Issue #2	Refer to Issue #4a
5. Long wait at Base 3 to progress to Base 4	Cars would get held up at base 3 because the inspector at Base 4 was not done. Base 3 inspector would take time to assist the inspector at Base 4, while cars were being held up.	Work done at all 3 bases is between 9 and 24 minutes of actual work, but with waiting times this would be between 15-25 minutes of work for smaller vehicles. Therefore, there is always around 6 minutes of waiting time. Base 3 consists of 1-2 minutes of work. Extension of this wait time at Base 3 therefore could be up to 6 minutes. (an extra 7% of waiting time).	Length of inspection increases, leading to further customer dissatisfaction and increased frustration. Refer to Issue #2.	6 minutes of waiting per Inspection is equal to 450 minutes of waiting all day. Thus, if an inspection takes 24 minutes of work, theoretically there is the opportunity cost of up to 18 vehicles not being inspected that day, or an opportunity cost of $316,875 in lost revenue due to excessive wait times.

6. Collection of documents by the clerk	Clerk in reception area collects completed documents from the inspection hall 2-4 times per day and recorded them between other assignments	Each trip between the reception and inspection hall takes 2 minutes. Entry of data by the clerk takes 1 minute per inspection. There are 75 inspections per day	Time is spent by the clerk needlessly moving between places. Waste of time and increase in employee frustration.	Up to 8 minutes a day is spent by the clerk moving to and from inspection bay to collect paperwork. Equal to $2.40 a day in clerk wages, or $624 annually.
7. Manual data entry	A clerk in the reception area collected the completed documents from the inspection hall two to four times each day and recorded them between other assignments.	On average, recording a single report requires about one minute of a clerk's time 75 vehicles are inspected per day	The clerks had to finish this work each day because the information had to be logged into the government database early the next morning. When inspectors worked overtime, the clerks also had to work additional overtime to finish data entry.	75 (75 vehicles x 1 min) minutes of manual data entry is needed. Per year, that is roughly 315 hours of the business' time that is spent on inefficiently manually entering data into the database.
8. Correcting inspection results errors	Reception supervisor receives document identifying the errors in the reports. The supervisor of the reception area would oversee process of correcting errors.	0.8% of reports have errors. Each inspection produces one report. Time taken to complete report is 1 minute of the clerk's time.	Supervisor and Manager of the Vehicle department are both required to complete this process, with multiple needless handovers and over processing.	Re-recording of the reports extends cycle time to 1.008 minutes (using a rework loop). Adds an extra 0.6 minutes' worth of work each day.

TO-BE PROCESS MODEL

Below we have outlined our proposed process model that attempts to amend these issues.

Figure 1: Vehicle Inspection Process

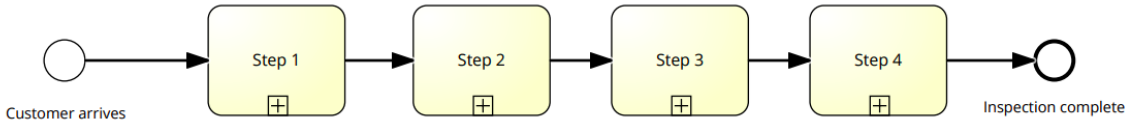


Figure 2: Step 1

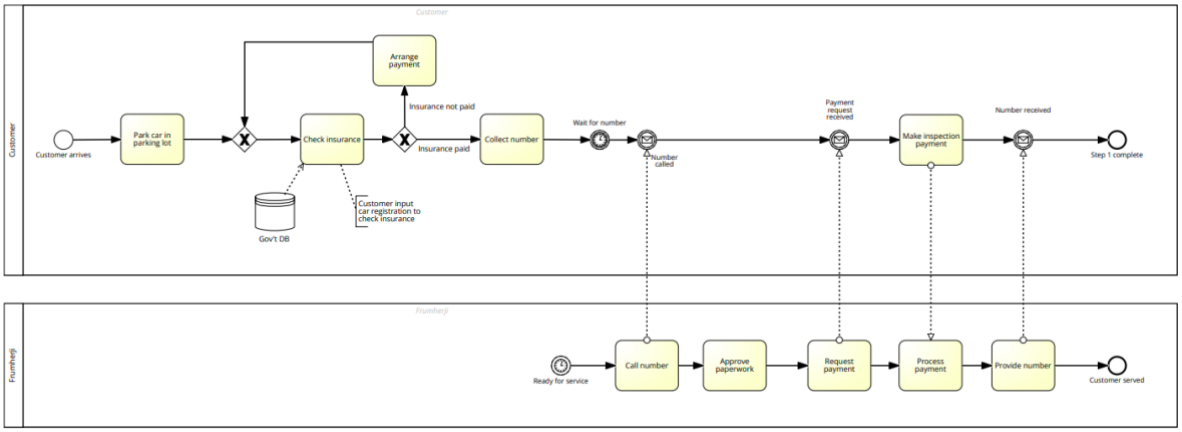


Figure 3: Step 2

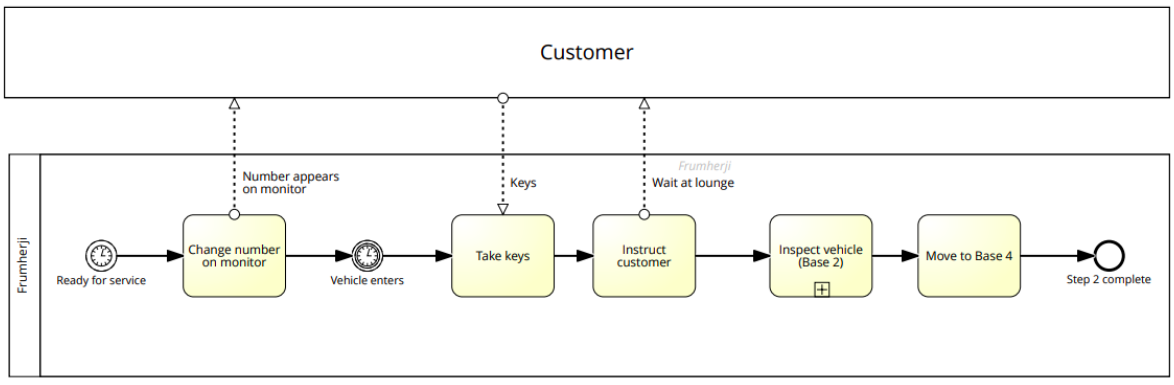


Figure 4: Inspect Vehicle (Base 2)

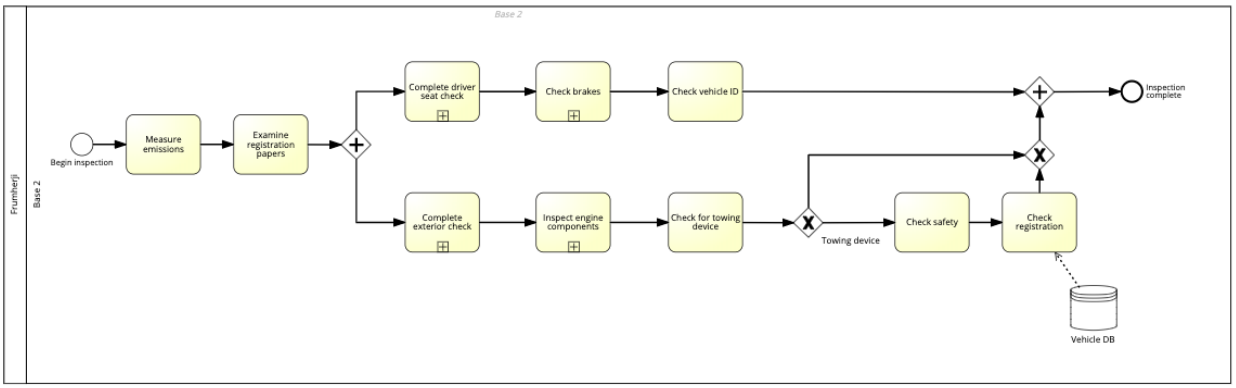


Figure 5: Step 3

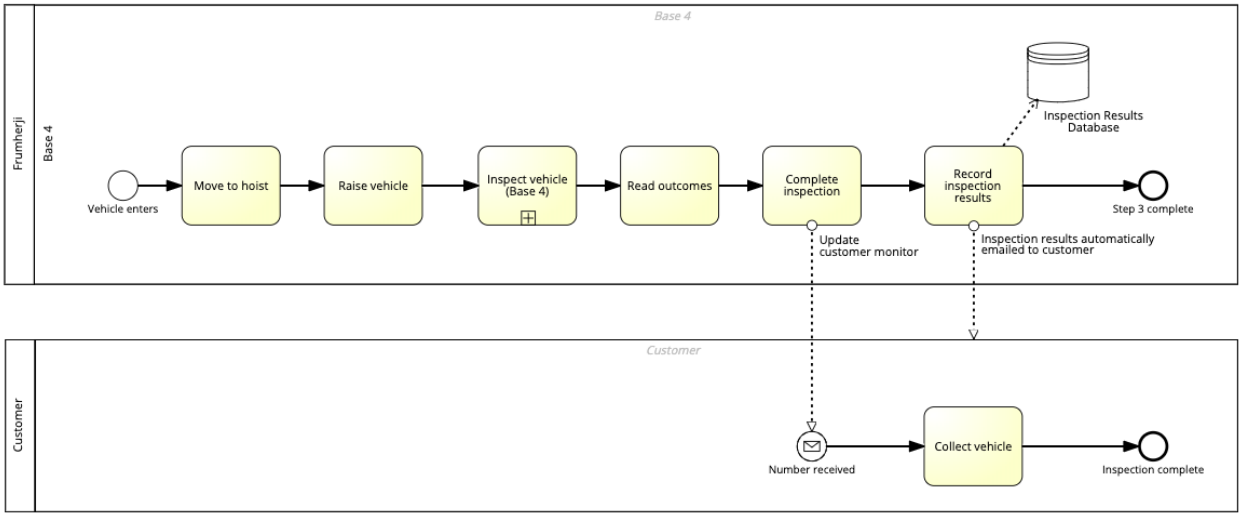
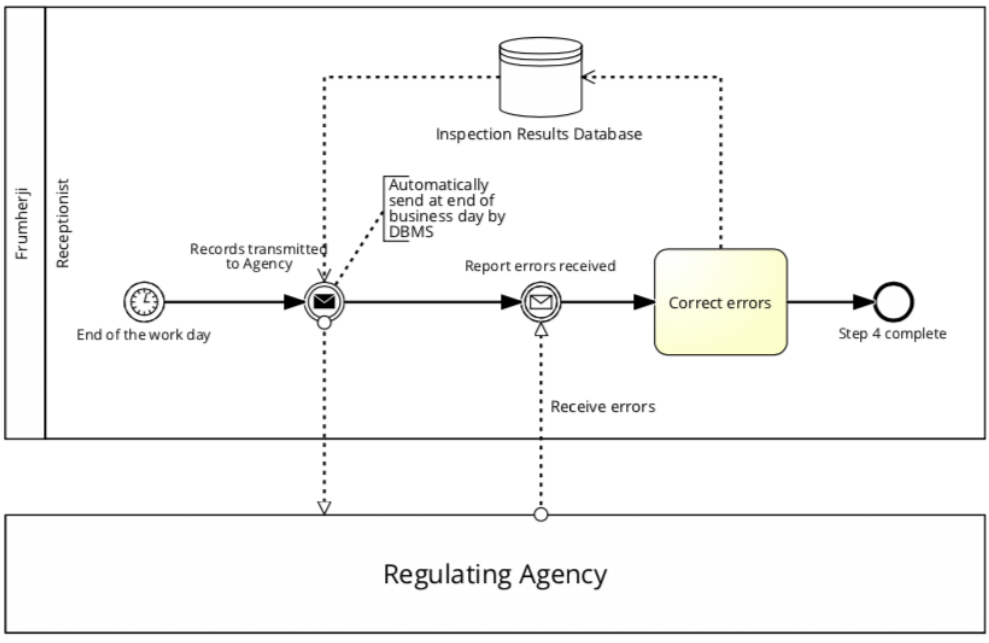


Figure 6: Step 4



REDESIGN CONCEPTS AND HEURISTICS

Our redesign of Frumherji's Inspection process has been guided by the Heuristic Process Redesign model. The assessment of issues to address is based on the PICK chart in Figure 7.

Figure 7 – PICK Chart of Inspection Process Issues

Parallelism was adopted through merging Base 2 and 3, as these tasks can be done with a second inspector permanently at Base 4, minimising waiting and delays. Further, customers can stop at either base with no impact on the inspection process. **Resequencing** was also implemented to resolve delays, such as requesting customer's keys prior to redirection, and checking insurance prior to adding the customer to the queue, thereby reducing the waiting and defects in these stages. The latter is also an example of **Automation** via the use of Automatic Number Plate Recognition that compares the plates with the Register of Vehicles of the Icelandic Transport Authority Database. This automation reduces the waiting time at reception and enables better-quality services for customers.

Furthermore, implementation of **Empowerment and Automation** by only having the Receptionist correct errors of the automated process, due to the fact that errors occur so infrequently (0.8% of cases) and automation of the recording process allows for more productive work to be completed.

Furthermore, **case-based work** was implemented, in removing the delay-ridden batch-processing approach, and instead having the inspector input the results into the database. In doing so, over-processing, unnecessary motion and room for human error has been drastically reduced. The elimination of manual data entry also utilises

the heuristics of **integral technology.** In digitalising the process, inspectors can now input results directly into the database, eliminating the need to store physical paperwork at reception. Moreover, this system enables real-time data, and allows for **activity automation** by automatically emailing the customer their results upon inspectors committing results, further reducing human error. By utilising these heuristics for redesign, Frumherji is able to improve the quality of their processes and achieve efficiency gains, leading to increased productivity and profitability.

CRITICAL REFLECTION

This team collaborated effectively in order to deliver solutions for Frumherji's problem areas. We were able to find potential solutions to issues by employing group decision making techniques, such as brainstorming potential solutions, evaluating options and then selecting the most viable solutions based off established criteria. By adopting allocative efficiency, the team split the workload into three sections; diagrams & mapping, written content and presentation. We were able to effectively delegate tasks by using Trello, and set out individual goals and responsibilities that each member adhered to.

Emergence of Problems and their Solutions

Whilst the group work was delegated effectively, obstacles arose throughout the project. With differing university schedules, several in-person meetings were cancelled, and our meetups weren't as frequent as desired. Regular communication via messaging platforms allowed for brief discussion, meaning that meetings were only conducted to complete larger tasks and scheduling of independent tasks. For example, the group would meet before the 9am Tutorial for an hour and discuss exactly what tasks need to be completed. In Week 8 the group met and discussed what needs to be completed for the to-be process and written components; with Mikayla taking on heuristics and Alex completing the critical reflection. In the future, more time spent collectively completing tasks such as modelling would have ensured consistency of ideas and perspectives on the case.

Smaller issues such as agreeing on which solution may be better for the overall processes encouraged the use techniques to resolve discrepancies. For example, when a unanimous decision couldn't occur, we utilised a 'decision by majority' approach. To disallow conflict occurring, we established that constructive feedback will be utilised, whereby group members give and receive feedback with positive connotations. This required focusing on ideas and behaviours, instead of individuals, and offering suggestions for improvement. Receiving feedback required listening, asking for clarification and being open to change and other ideas. Too little conflict in group can result in apathy, lack of creativity and indecision, and thus by having in-depth discussions regarding solutions, we were able to use this conflict productively and advantageously.

Overall Team Organisation and Team Member Contribution

In order for the task to be completed efficiently, members were allocated tasks based upon their skill sets. Joanna, as the project leader, was on top of task delegation and

scheduling, and thus had a role in the finalisation of every stage. Alex's role was oversight of written components. Mikayla worked in between the written components and the models, making sure an integration between both occurred, while Luna and Lois were the primary actors in the development of process models.

In part A, Alex and Mikayla focused on identifying the process and challenges, while Luna and Lois developed the model, with Joanna overseeing all components. In Part B, Mikayla developed the value-added matrix, Joanna and Alex created the issue register, Luna and Lois developed the to-be process model, Mikayla and Luna established the redesign heuristics, and Alex wrote the critical reflection. All team members were extremely flexible in that they could assist in all parts, for example, Joanna was able to assist in the editing of written content, and Alex with the to-be process model. Upon reflection, the only critical point for improvement is that team members could have worked together at the same time, as changes to the project outlook might not have been translated to other components in an efficient manner.

Problem Solving

The team was most productive at solving problems as an entire group, and mostly in a formal meeting setting, due to the speed and efficiency with which members could share opinions and debate issues. However, the mostly online format of group discussions did not facilitate this as much. Problem solving would stagnate, with delays in messages making it difficult to solve problems quickly and efficiently. When possible, we utilised problem solving techniques, such as brainstorming, visual diagrams, and encouraging many ideas. When proposing a solution, we utilised a Devil's advocacy approach, whereby a member of the team would test the strength of the proposed solution in the context of the overall business processes, allowing us to consider as a team if this ultimately adds value to the organisation. This approach was exemplified when the team was considering digitising the inspector's paperwork. Alex, Luna and Lois were giving the proposal and Mikayla and Joanna were questioning the strength. This technique allowed us to delve deeper into the issue and consider how this would affect the entire process.

Time Management

Due to the hectic schedule of each group member, the available times that individuals did have to work on the project was done efficiently as managing time efficiently and not wasting time became a priority. Every group member was able to meet deadlines, as the pressure of other commitments made efficient work paramount. Specifically, in Part A the group had completed the task well before the final deadline due to other, more challenging assignments that were due on the same day needing to be factored into the group's schedule. This left a sufficient amount of time for editing to ensure that the best final version was delivered. However, the groups time management for Part B could have been improved as the final version wasn't finalised until a few hours before the initial due date deadline, meaning that the final product may have been rushed and not to the desired standard of quality if not for the task extension.

The story behind our group's journey shows a team that utilised their time, skills and collective drive to achieve the established goals by utilising a dedicated work ethic. While there are definitive areas we can improve upon, we are extremely pleased with the outcome of our project.

ASSUMPTIONS

As-is:

- Vehicle inspectors are paid $35/hour (due to requirement for qualifications)
- Receptionists are paid $27/hour
- Clerk is paid $18/hour
- The inspector either retrieving keys from a customer or waking up a customer asleep in their car occurs in 5% of cases
- For consistency of findings, we only looked at the opportunity costs of moving smaller vehicles through the inspection process, as we assumed that small and large vehicles face the same issues and waiting periods at the same frequencies

To-be:

- Inspectors have technical knowledge and know how to enter customers data into the database using the proposed new system
- When a car is registered in Iceland, their email is saved with it and can be accessed by Frumherji
- Regulating agency accepts one daily report that includes all inspection reports from that day, and thus will not review reports that are sent more frequently than this (e.g. will not review 75 individual reports sent throughout the day, but only as a collective).
- Assume that all fields and information on the as-is inspection form (Exhibit 3 in case study) is in the new system that the inspectors will populate inspection outcomes with

REFERENCES

En.wikipedia.org.(2019). *Automatic number-plate recognition.* [online] Available at https://en.wikipedia.org/wiki/Automatic_number_plate_recognition [Accessed 10 Nov. 2019].

Island.is. (2018). *Registration and examination.* [online] Available at: https;//www.island.is/en/travel_and_transportation/the_car/registration_and_examination/ [Accessed 10 Nov. 2019].