2016). The HIS manager has chosen three objectives: Customer satisfaction, Reduce costs and Reduced treatment time.

After the identification of the objectives, we defined the performance indicators for verification after the implementation of Lean approach. La Table 3 illustrates the selected performance indicators.

Table 3. Performance indicators

Indicator	Description
Average waiting time of the patient	Calculates the average time a patient has to wait between registration and consultation.
Number of visitors (patients) leaving without seeing a doctor	Indicates the number of people who come to the hospital and fail to see the doctor.
Level of patient satisfaction	Indicated if patients are satisfied with the level of care they received.
Number of hours of patient contact	Indicates the time that health care staff spend directly with patients
Average processing load	Indicates the average cost to treat a patient.
Equipment utilization rate "By type"	Counts for the number of days the equipment was actually available compared to the number of days the equipment was needed.
Number of patients served per month	Counts the number of people receiving care each month
Readmission rate «With the pattern (typing)»	Calculates the number of patients the service receives.
Admission rate	Calculates the number of patients the service receives.
Percentage of canceled or missed appointments	Calculates the percentage of canceled or missed appointments

1.2 Understand the environment

A meeting with the manager of the Surgical Diagnostic System helped us identify the processes to be improved, which are the trauma, pre-anesthetic consultation and urology processes. In this phase, the manager preferred to choose only the step of process selection. He chose the trauma consultation process as the first process to improve.

1.3 Understand the process

The manager selected only the step of building a team dedicated to this process. Therefore, the selected team consisted of: Head of surgical pole "Manager", Senior nurse, Trauma surgeon, Medical secretary

The first step is to establish process mapping. In our case, we chose BPMN to build trauma process mapping. Figure 2 illustrates this mapping.

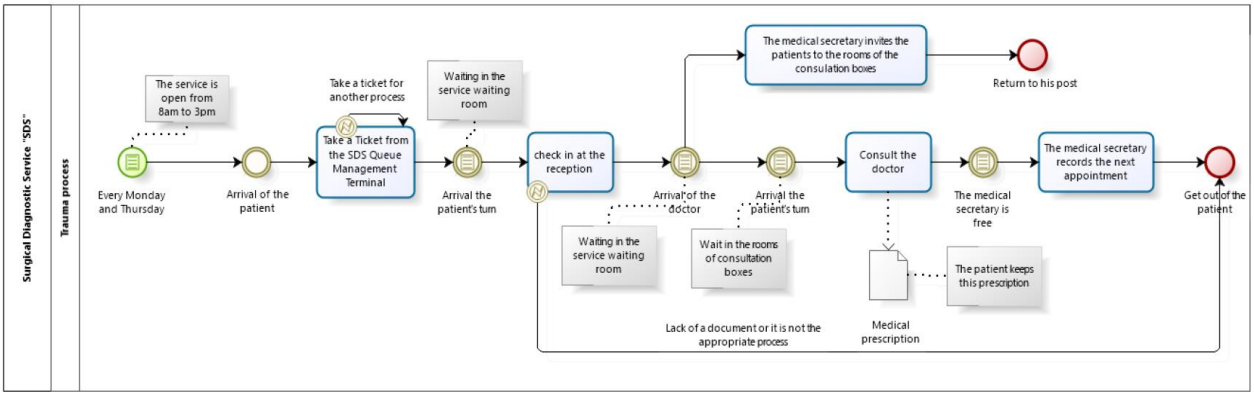

Figure 2. Mapping the trauma process

After the trauma process mapping, we moved to the "Measure the process" step. We measured the length of stay of the patient starting from the entrance to the process until the process exit, for a day. In this process, there is no computer system that records the number of patients arriving or a clocking-in and out system to record the time of entry and exit of the process doctors. But there is an electronic queue management system to streamline the registration and consultation phase. So, we observed the patients and the doctors and we recorded this information in a manual way. Figure 3 illustrates the indicators that we have been able to derive from our observations in the field.

We noticed that only 52% of the patients were registered at the entrance as well as at the exit. It was very difficult to record the timing of exit of each patient, but the timing of entrance was easier to record since it is mentioned in the ticket that patients take via the electronic system. The average waiting time of a patient in this process is high. Also, the number indicated in the patient's ticket and that is used for patient queue management, is not always respected during the consultation phase.

An in-depth analysis of these indicators will be performed to identify problems in this process as well as the root causes, in the fifth phase of the personalized roadmap, which is not the focus of this paper.

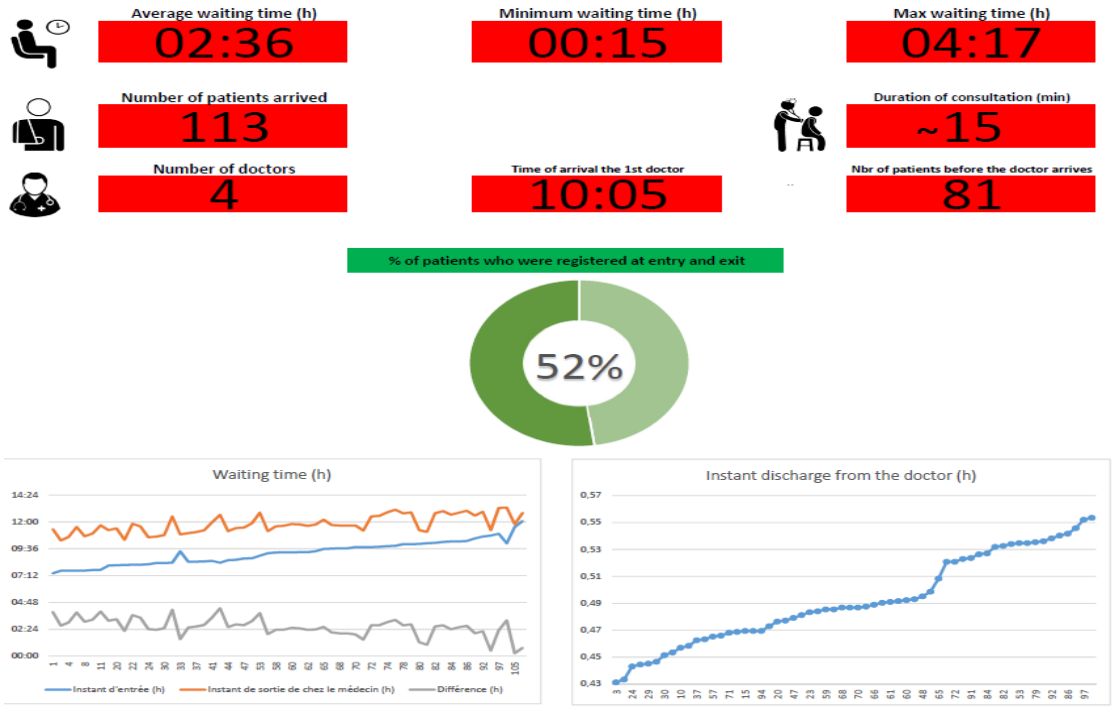

Figure 3. The indicators collected

4. Conclusion and future work

This paper introduced our Lean method for business process improvement based on 34 Lean methods. This method is a hybrid Lean method that involves using tools as part of steps to meet objectives while verifying principles. This paper also presented our progress of the implementation of Lean approach in the hospital of Meknes in Morocco. This case study focused on the application of our method to improve the trauma consultation process. We applied three phases among seven phases of this method namely: "Define the goals", "Understand the environment", and "Understand the process". Afterwards, we plan to identify added and non-added values and analyze the waste in this process to identify its root causes and then propose and apply innovative solutions to address these issues in order to maintain and sustain our improvement.

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Biographies

Younes TIAMAZ is a Phd student at Mohammadia Engineers School, Morocco in improvement process. He obtained an engineer degree in production system from MINES-RABAT School, Morocco and a Bachelor of electrical engineer from Hassan I University, Morocco.

Farid Lahboube is a computer science engineer and a member of the SIWEB Research Team. IT Project Manager. He is interested in the issues related to the supervision of complex systems.
Nissrine SOUISSI is a fulltime professor at the MINES-RABAT School, Morocco. She obtained a PhD in computer science from the University of Paris XII, France and an engineer degree in computer engineering from Mohammadia Engineers School, Morocco. Her research interests include process engineering, business process management, lean, databases, data lifecycle, smart data, hospital information system, and information system.