Information Systems 01PDWOV
4 February 2019

Books, notes are not allowed. Write only on these sheets.

Vehicle transfer of ownership.

In all countries a state agency keeps track of all vehicles, their characteristics and their owners.

In Italy the Ufficio per la Motorizzazione Civile (a branch of the Ministry of Transport) manages the technical side of vehicles. It is the entity that decides if a vehicle can circulate, in the positive case issues a tag for the vehicle, and a corresponding 'vehicle registration document' ('carta di circolazione') that contains the technical description of the vehicle (type of engine, emissions, power, vehicle dimensions, tyres, etc)

For historical reasons another entity, Automobile Club d'Italia (ACI) keeps track of ownership of vehicles. The PRA (Pubblico Registro Automobilistico), managed by ACI, contains the list of all vehicles that can circulate (i.e. that have a 'vehicle registration') and for each vehicle all owners (current and past owners). The PRA issues another document, the 'certificate of ownership' ('certificato di proprietà') that states who is (are) the current owner(s) of a vehicle.

Transfer of ownership process.
AS IS process
A certain vehicle V is owned by O, who wants to sell it to B. O and B sign a sale contract, on paper and with a defined template. The sale contract is certified by an authority (a notary, or a public servant). The buyer B has to pay to certify the contract, placing a 16 euro stamp ('marca da bollo') on it (and possibly paying the service if a notary was involved).
The sale is also manually recorded on the certificate of ownership owned by O.
The buyer B then brings the certified sale contract and the certificate of ownership to a PRA office. Here B pays taxes for the transfer (taxes depend on the vehicle, power and pollution level). Then the office records the new owner and issues a new certificate of ownership to B.

TO BE process.
Propose a new process, fully online. Assume that both O and B have public digital identities. A public digital identity (in Italy the SPID) allows to authorize with a very high level of trust citizens that want to access digital services provided by the public administration. For instance SPID requests username, password and one time password sent on a mobile phone.
Assume also this new process is supported by the PRA, that builds a dedicated web site, accessible by SPID. Also all payments must be performed online (no more stamps).

In the following model the AS IS situation.

1   Organizational model: list roles or organizational units involved (AS IS)

UMC, ACI/PRA, owner, buyer, notary/public servant, payment system (post office or similar)

2 Functional model: Design and model (using BPMN + UML class diagram) the process (AS IS)

Tag could also be an attribute of VRD. Or also an association class between UMC and Vehicle to stress that it can change in function of the country (and related Ministry of Transport issuing the tag) where the vehicle circulates.
Owner, buyer, seller are roles (same person can be buyer or seller over time), so they should NOT be represented as classes (object that is instance of a class cannot change class – so owner would be owner forever).

For simplicity Vehicle has one owner – but in reality more people can share ownership
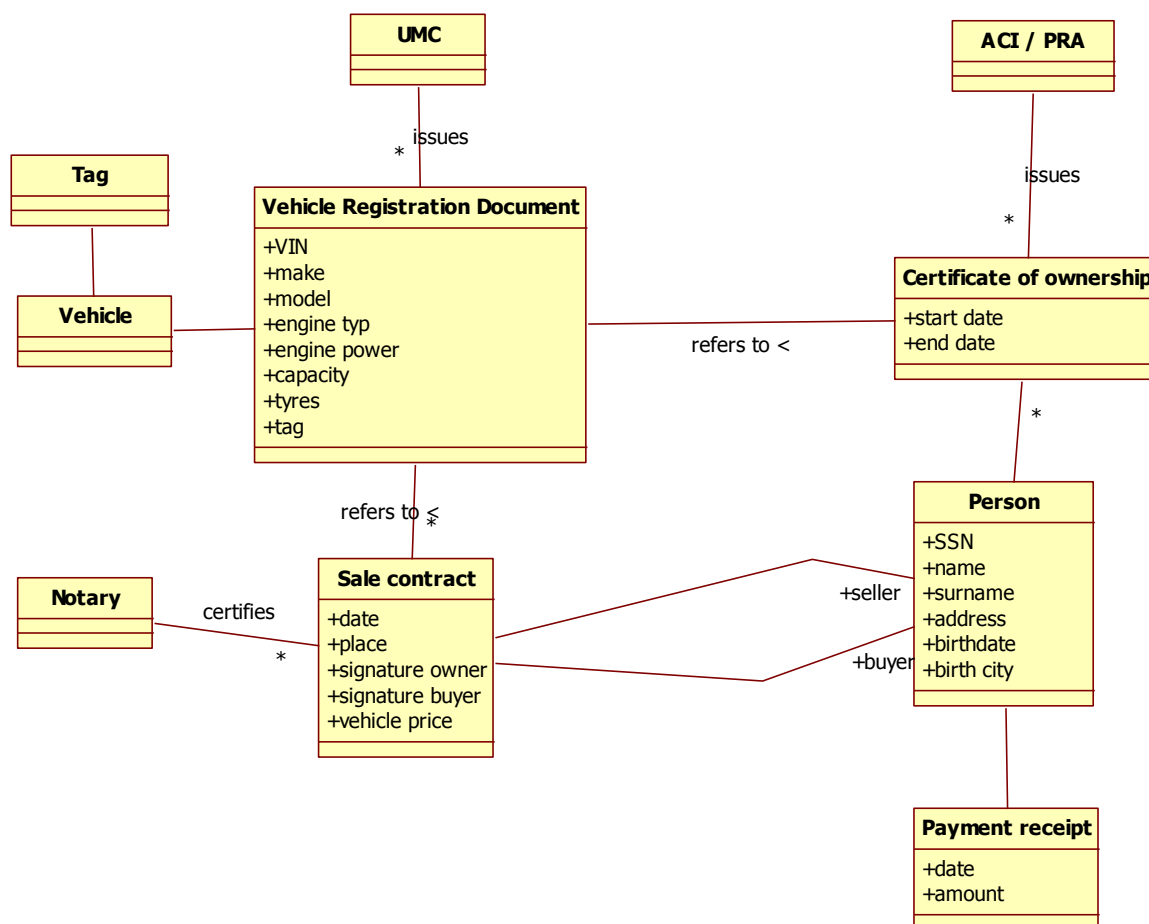
In the BPMN for simplicity only the nominal flow appears. In nearly every task there could be exceptions and therefore abort or step back of the process. In the process it is important to represent distinctly owner (or seller) and buyer.
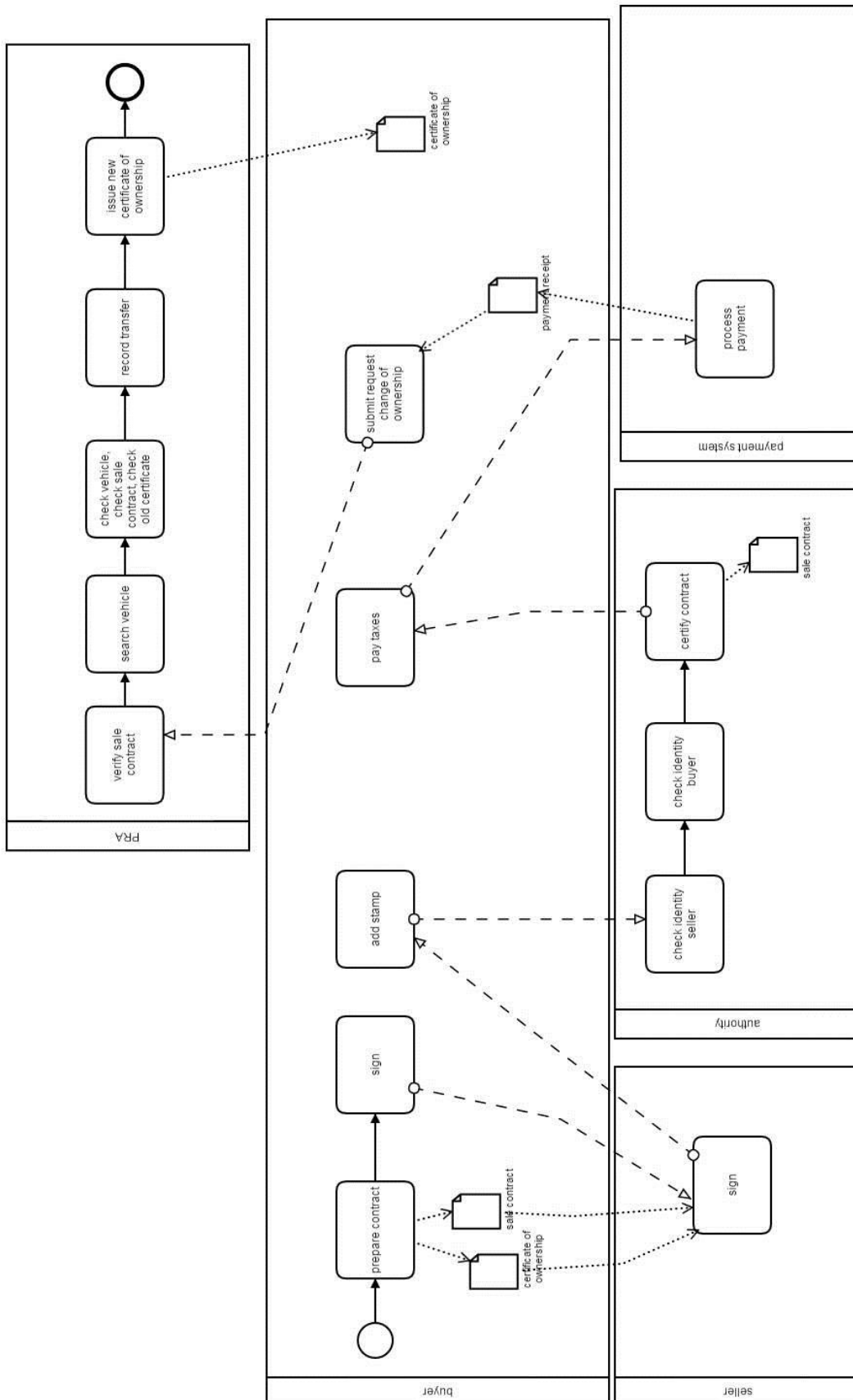
In the following model the TO BE situation.

3 IT Model / Technological model: describe the hardware architecture of the system   (TO BE)

Client: Smartphone or PC for buyer and seller
Server: Conceptually one server for UMC + ACI managed data, and one application server to manage the transfer of ownership. This latter server interacts with payment system, SPID and date server(s).

4 Organizational model: list roles or organizational units involved (TO BE)

UMC, ACI/PRA, owner, buyer, SPID authority, payment system (credit card, bank, PagoPA or else)
The UMC still appears because it is the owner of the VRD (while ACI is owner of certificate of ownerships). Clearly UMC and ACI should be merged, but they are not merged for political reasons – very meaningful example of political issues in organizations, in this case parts of the Public Administration.

5 Functional model: Design and model (using BPMN) the process (TO BE) (NO CLASS DIAGRAM required)

The class diagram remains basically the same (SPID would substitute Notary). This is very typical, processes change while the information part remains quite stable over time.

In the BPMN the main change is the SPID service provider that authenticates both buyer and seller, replacing the notary (or equivalent role), so the sale contract can be signed online (the task of the notary is in fact to certify the identity of buyer and seller and certify they agree to the exchange).

Remark that the SPID service is one for all the public administration (as the digital identity of a citizen must be unique for the whole PA). Further, the buyer (again, identified and authorized via SPID) can request online the change of ownership.

5

5 Define the KPIs, considering these high level business goals (or CSF), CSF1 increase customer satisfaction, CSF2 reduce the cost of the process. In the table below show the correspondence CSF – KPI

CSF name	KPI Category (General, cost ..)	KPI Name	KPI Description	Unit of measure
	General	NT	Number of transfers per year	
CSF2	Efficiency	UC	Cost per one transfer (PRA side, not customer side, do not include here effort of seller buyer) = (effort of PRA employees + cost of paper / ink + cost of IT infrastructure) / NT Formula works both in as is (less or not IT cost) and to be (less or no employee effort, no paper ink)	Euro
CSF1, CSF2	Service	LT contract	From 'buyer prepare contract' to 'authority certify contract' (see as is BPMN)	time
		LT registration	From 'buyer submit request of change of ownership' to ' PRA issue new certificate of ownership' (see as is BPMN) Only one LT considering both contract and registration is not meaningful in as is – long idle time can pass between contract and registration (max 60 days by law)	time
		LT registration _ToBe	From 'seller authenticate and authorize' to 'PRA issue new certificate of ownership'	time
CSF1, CSF2	Quality	E	Number of transfers with problems / NT Problems: wrong owner / seller / vehicle data; fake sale contracts; fake stamps	%

6 Compare the previous and the current situation, using the KPIs defined above

KPI	AS IS	TO BE
NT		No change
CU	Effort of employees	Lower, effort of PRA employee possibly zero Effort of PA employees to certify signatures zero Effort of notary zero (this implies no revenue for the notary who is the only loser in this change)
LT contract		Much shorter, no need of physical authority to certify identity and contract
LT registration	For citizen, time to go to offices and paperwork	Much shorter, all from home

Define the TCO to shift to the TO BE situation

Phase	Cost
Construction	Define requirements for new IT application, develop or acquire it
Deployment	Deployment of new IT application, training of employees
Operation	Electricity, conditioning
Maintenance	Fix of defects, development of new or enhanced functions
Dismissal	Port of data to new system

$TCO = C+D + 5OM$

$TCO_{per\ year} = TCO/5$ (assuming 5 years depreciation period and 10 years usage)

7 Considering a 5 years period, define costs and savings (ROI analysis) by adopting the TO BE situation

Year/ cost or saving	Year 1	Year2	Year3	Year4	Year5
Cost	C, D				
cost	O, M	O, M	O, M	O, M	O, M
saving	S				

S = effort of employees at PRA (all checks automated, no more data entry), cost of paper and ink

9 Considering the KPIs and the ROI, is the TO BE situation better? (answer Yes or No): yes

Why?

All KPIs improve, both on the administration side (PRA) and the citizen side. The advantage is especially huge for the citizens.
The SPID service may have a cost for citizens – however SPID is used for all PA services, so it is hard to allocate it (indirect cost). Anyway, as of today a SPID service for one year costs less than one stamp (useful for one certification only).

10 What is the pros and cons of defining business rules independently of applications?

Pro: business rules are definedc in high level, readable form (clarity)
Pro: business rules are defined once for all applications (consistency)
Pro: business rules can be evolved once for all applications (less cost of maintenance)
Con: more complexity in set up and maintenance of BRMS

11 In the context of business strategies, describe the multi sided model and provide an example.

See slides

12 What elements are considered by Function Point Analysis to estimate the size of a project?

See slides

13 The Ufficio Motorizzazione Civile is part of the Ministry of Transport, and deals with whatever is related to vehicles. Other parts of the Ministry deal with ports, roads, airports. It has offices in each large city. What kind of organizational structure is this?

Divisional (ports, airports..)
Geographical (repeated offices)

14 Describe the main activities in the 'Build and acquire' process of COBIT

See slides