Theoretical questions

Chapter 1: Definitions

Write one or more examples of technological innovations that deeply impacted a business domain, and therefore the strategy of companies within the domain
Digital cameras (Fuji vs Kodak)

Chapter 2.1: High Level Models

What are the main processes in the telecom domain?
Network management, service management, workforce management.
By using the value chain model, the main processes are operations, marketing & sales and after sale service

Consider a bank. What are the main high level business processes they have to set up and operate?
Service Management where services are account, investment, and lending.
By using the value chain model, the main processes are operations, marketing & sales and after sale service

What are the main processes in the retail domain?
Procurement and inbound logistics, stores management.
By using the value chain model, the main processes are outbound logistics, operations, and marketing & sales

What are the main processes in the process industry (oil, chemical products) domain?
Production and Maintenance of plant.
By using the value chain model, the main processes are inbound logistics, operations, and outbound logistics

Consider an insurance company. What are the main high level business processes they must set up and operate?
Service Management where services are insurances on vehicles, life, pension, and health plan. Vertical processes are Operations, marketing, and sales, after sales service (damage processing is here).
By using the value chain model, the main processes are operations, marketing & sale and after sale service

Consider a Utility (seller of electricity, gas, water or similar). What are the main high level business processes they have to set up and operate?
By using the value chain model, the main processes *are operations, marketing & sales and after sale service*

Chapter 3: ERP – CRM

What are the three key ideas of the ERP model?
Data sharing (no replication and consistency), modularity (independent modules) and prescriptivity (same approach for all companies).

What are the main functionalities offered by a CRM package?
CRM paradigm: multichannel interaction with customers, uniqueness of data and service and end to end service chain.
CRM main functionalities:

- commercial logistic
- multichannel interaction with customer
- after sales
- analytics of customers

The ERP model proposes 'data sharing' instead of 'legacy islands' in information systems. Explain briefly.
Legacy islands are applications working on local data that is replicated (example: list of customers replicated between application to support marketing and application to support warehouse and shipping). Data replication implies inconsistencies in data and cost of tools to support data consistency.

In terms of CRM, give an example of a complete, end-to-end service chain.
It is the set of activities done from before to after the purchase. Receiving order of item from customer, planning and executing production of item, shipping item, monitoring user satisfaction, providing assistance in using item.

Describe the high-level software functions offered by an ERP.
- Operations support (material planning, production planning, …)
- Product life cycle management
- Management support (strategic planning, budgeting, ...)
- Supply chain management
- E-procurement
- Administration support (Finance, HR management, …)
- Customer relationship management

Define the meaning of 'prescriptivity', its pros and cons
The ready-to-use software modules of an external company contain a partially modifiable business logic, where each change takes time, money and a lot of effort.

Chapter 4: Strategy

Describe the four possible strategic choices for an organization, according to Porter.

		COMPETITIVE ADVANTAGE	
		LOW COST	**UNIQUENESS**
FOCUS	**WIDE**	**Leadership on cost** (Toyota, Nissan, VW, …)	**Differentiation** (Ferrari, Audi, …)
	NARROW	**Leadership on cost and focus** (Toyota Prius, Nissan Leaf, …)	**Focused differentiation** (Tesla)

Leadership in cost or quality, mass production or niche
An organisation whose aim is to offer products at the lowest possible cost and to play on the whole market must sell as many products as possible. If, on the other hand, the organisation seeks to sell unique products, it does not focus on the quantity of goods sold but on quality, on uniqueness. Even in niche markets these two extremes are present, and the reasoning is practically the same with the difference that the number of customers reached as well as the number of different products is smaller.

Considering the thesis management case, and considering the Business Model Canvas approach, characterize CR (customer relationship) and the CHANNEL between the student and the university.
CR: self-service (no customized service, no dedicated personnel) Channel: web portal

Considering the Business Model Canvas approach, briefly describe the multisided business model, and provide an example of it.
It aims at having together distinct but interdepend groups of customers (sides).
Two sided: google search engine (free for end users, paid for companies who want visibility).
Two sided: commercial TV (free content for end users, paid ad time for companies).

Describe the long tail model, and in which contexts it can be applied.
Sell few quantities of a huge selection of items (vs sell huge quantities of few best seller items)
Conditions that made it possible

- Democratization of tools of production
- Democratization of distribution
- Better link supply – demand

Ex Ebay.

List the possible Customer relationship modes according to the Business Model Canvas.
Type of relationship between organization and customer segment. Main goals are customer acquisition, customer retention, upselling.
Possible customer relationships are:

- Personal assistance: Face to face or via email or call centre
- Dedicated personal assistance: Ex upscale financial services
- Self service
- Automated service: As self-service but customized on customer
- User community: To share knowledge and support customers
- Co creation: Ex you tube, amazon book reviews (by customers)

Sketch here the BM canvas for CARS.
Key partners: car manufacturers, airlines,
Key activities: customer relationship, car maintenance, car selection and allocation
Key resources: cars, parking lots, reservation system (IT)
Value proposition: car rental with best service and low prices
Cost structure: cars (purchase and maintenance), personnel, IT
Customer relationship: self-service,
Channels: web, call centre, (office)
Customer segmentation: businessmen, tourists, ...
Revenue stream: rental fees, car resell

Define fixed vs. variable costs, make an example
Fixed costs do not depend on the number of items sold/products (e.g., infrastructure cost), and variable costs, which depend on the number of units sold (e.g., electricity costs).

According to the Business Model Canvas model, list the possible Customer segments
Entire population (mass market), only a certain subset of the population (niche market), segmented to focus on different segments (different markets), diversified to focus, multisided

Chapter 5: Management IS

A company produces vehicles. What could be its CSF (Critical Success Factors) at corporate level?
Quality, cost, reliability, dealer's network, brand recognition.

What is the management cycle? How indicators such as KPIs fit into it?
Define goals (and related measures such as kpis), collect measures from the operation level, compare actual measures and goals, do corrective actions if needed.

Consider a car glass manufacturer. Define, using the Balanced Score Card (BSC) approach one meaningful indicator in each dimension of BSC.
BSC perspectives: financial, customer (value proposition), internal process, innovation and learning. Indicators for each dimension: Financial → cash flow; Customer → customer satisfaction; Internal process → performance quality; Innovation and learning → employee turnover

Consider a company that produces processed food (ex. canned meat, snacks). Define, using the Balanced Score Card (BSC) approach one meaningful indicator in each dimension of BSC.
Indicators for each dimension:
Financial → cash flow; Customer → quality; Internal process → performance quality; Innovation and learning → employee turnover

Chapter 6: Organizations

In organizational terms, what is a 'Machine bureaucracy'?
It is a mid-sized manufacturing firm.

Give a definition of SOP and an example.
The activities which can be completely formalized are called Standard Operation Procedure (SOP) and they could normally be automatized. Typically, formalization means more efficiency, predictability and resistance to change but also less flexibility. An example of SOP is the bank transfer

Provide an example of a company that is organized in both functional and geographic units.
Geographic: the same function is **replicated** geographically (ex. Apple, sale function in Europe, in US, ...)
A function located in many places (ex. factory for engine in Melfi, for body in Turin) does not mean geographical organization.

What characterizes a divisional organization?
Each division focused on a product, replicates some functions.

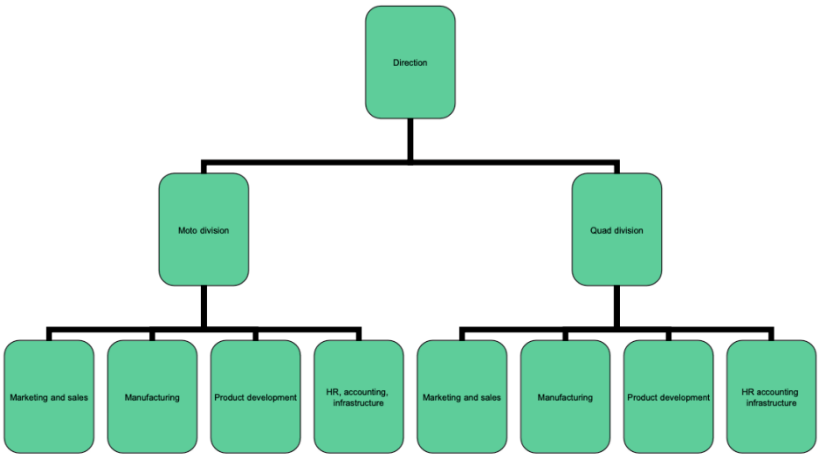
A company produces glasses for cars, it has an office in Turin, with the direction, sales office, accounting office, human resources. A factory in Nice (France) and another in Naples. There is no design office (designs are received from the car manufacturer). What kind of organization does it follow?
Functional (no functions are repeated.) It is partially geographical because manufacturing is repeated in two places (assuming that the same products are produced in the two factories).

An insurance company is organized as follows: a holding company owns three other companies: OnlineI proposes and sells only online car policies; TraditionalI proposes and sells life and car policies through a network of sales offices throughout Italy; DamageE performs damage evaluations, for OnlineI, for TraditionalI and for any other insurance. What kind of organization is using this company?
Divisional (one for online sales, one for traditional channel sales, one for damage evaluations). DamageE could also be seen as a function common to the divisions.

Propose an organization chart for METROT (around 50 administrative people, 2000 drivers, 50 mechanics for maintenance). Write clearly what organizational model you use.
Given the medium size and the product (one product with little innovation levels) the organization could be functional: sales (ticketing, tariffs, sales); production (management and maintenance of vehicles, lines, drivers); human resources, administration. A design office could be in charge of designing and adapting the product (bus / tram lines and services). An IT office could be in charge of IT support and technologies in general. A reasonable option is to have a functional organization, with production unit split in three (bus, tram, metro).

Propose an organization chart for GYM. Write clearly what organizational model you use.
Functional: finance, HR, accounting, marketing are centralized in headquarters
Geographical: 'manufacturing' (in sense of operating the centers) and sales (in sense of managing payments from customers) are replicated in each center.
Remark it is not divisional. The product / service offered is the same by all centers, so it is geo+functional.

Sketch below an organizational chart for a company organized in divisions.



In terms of organization theory, compare an organization of type 'bureaucracy' with one of type 'startup'.
Bureaucracy: large size, high depth in org chart, medium / high formalization and specialization, closer to mechanical system (more efficient than flexible).
Start up: small size, (nearly no) depth in org chart, very low formalization and specialization, closer to natural adaptive system (more flexible than efficient).

The WATER company covers the Piedmont region. It has one technical office and one commercial office in each province of Piedmont. Headquarters, HR, accounting and IT are in Turin. What kind of organizational structure is this?
Functional (headquarters, HR, accounting IT) + geographic (tech + commercial offices)

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).

A company has two full time employees, and one part time (50%) employee. How many FTE does the company have?
(1+1+.05) = 2.5

The CARS company operates in Italy. The headquarters are in Rome. They deal with reservations, commercial policies, accounting, HR, IT, and they monitor the fleet of cars (purchases, resales). Throughout Italy are offices. Each office manages interaction with customers, and maintenance of car (cleaning, simple maintenance). What kind of organizational structure is this?
Functional + geographic

A small manufacturing company has a factory, a warehouse, an administration office, a sales office in Turin covering Italy, a sales office in Madrid covering Spain and Portugal. What kind of organizational structure is this?
Geo (sales), functional (manufacturing, admin)

In a large company the IT function can be centralized or decentralized. What are the advantages and disadvantages of centralized IT?
Advantages of centralized IT: standardization of data and procedures, no redundancy of data, economy of scale in operation of IT and purchase of hardware and software.
Disadvantages: less reactivity to requests from other business functions / units, less specialization

Describe the 'Conway's Law' and its application to Information systems.
The structure of an IT system mirrors the communication structure of the organization that produces it.
Ex: if a company has 3 IT offices, it will have 3 IT islands (DATA REPLICATION problems)

What are, according to COBIT, the main processes in the Deliver and Support domain?
- Manage operations
- Manage service requests and incidents
- Manage problems
- Manage continuity
- Manage security services
- Manage business process controls

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

- BAI01 Manage programmes and projects
- BAI02 Manage requirements definition
- BAI03 Manage solutions identification and build
- BAI04 Manage availability and capacity
- BAI05 Manage change acceptance and transitioning
- BAI06 Manage organisational change management
- BAI07 Manage changes
- BAI08 Manage knowledge
- BAI09 Manage assets
- BAI10 Manage configuration

Programme == many related projects
For one project:

- Define requirements
- Identify solutions, build

Horizontal / support activities

- Change test and deploy
- Org change
- Changes, knowledge, assets, configuration

Chapter 7: IT Economics

Describe the Total Cost of Ownership (TCO) for a software package (such as Excel).
Search and evaluate, acquire, install (first time), learn, install (patches and fixes), uninstall

Describe the Total Cost of Ownership (TCO) for a software service (ex an ERP used as a service).
Search for vendor, contract negotiation, service quality monitoring, service fee.

The strategic goal of a service company is 'customer satisfaction'. Because of budget restrictions on IT, whenever a customer accesses the web site of the company to obtain a service, he or she has to wait too much. This is a symptom of what?
No IT Alignment. The customer must wait (because of poor IT) and 'customer satisfaction' goal is missed.

What are the main points of Agency theory?
Firm made of principal (owner or shareholders) and agents (employees and managers).
Firm based on a web of (explicit or implicit) contracts between principal and agents.
Agents have own interests and goals, and they try to maximize individual utility – not only the firm's utility.
The contrast between goals of agents and principal causes agency costs (to be reduced as much as possible).
Costs:

- Monitoring: Control of agent by principal
- Bonding: Reporting, by agent to principal, on activities done
- Residual loss: Lost profits by principal, due to suboptimal behaviour of agent

What has been the effect of the wider adoption of IT on agency costs?
Reduction in monitoring and bonding costs, possibly limited reduction in residual losses

'Decision cost': explain the concept and how IT influences it.
Assumptions:

- Decisions are taken at many levels of organizations
    - Allocation of decisions to levels in hierarchy is an organizational variable
    - Information is key to support decisions – but also imprecise, wrong, unavailable, delayed
    - Capacity of information management by individuals is limited
- Bounded rationality [Simon] (not all information are available)
- Analysis paralysis (too much information does not help)
- Structured and unstructured decisions
- Planned and unplanned decisions
- Conflicting goals in decisions (cfr. Agency theory)

Decision costs (If decisions are taken where information is not produced):

- Communication, documentation (miscommunication): Cost of collection and transmission of data to higher levels
- Opportunity cost: Delays in availability of information at higher levels and lost opportunities
- Suboptimal decisions: Because of delays / imprecision / cognitive biases

The effects of IT on decision costs are more quantity and better quality of information, more powerful tools to support decision process but there could be a problem of information overload.

Describe at least one of the cognitive biases that affect decisions.

- Optimistic bias: Tendency to underestimate costs and overestimate benefits.
    - 'illusion of control' effect: Overestimation of ability to control events
    - 'overconfidence effect': Confidence in one's judgements is higher than objective accuracy of judgement
- Bandwagon effect / social conformance: Do what others do (decide what others decide, perceive what others perceive) → Can prevail on perception of facts
- Confirmation bias: Search for, recall, interpret information that affirms one's prior belief or hypothesis
- Repetition: The more a statement is repeated, the more the belief in it strengthens
- Authority bias: Statement by an authoritative person is more trusted
- Anchoring: First piece of information considered biases the subsequent process
- Loss aversion: People prefer to avoid a loss than achieve a gain

Describe the differences between 'time and material' and 'fixed price' market transactions.
Time and material: Contractual agreement on cost of work (time) and material

- Ex, build a house: pay material + n person days, @M Euro / day
    - Issue: buyer may control quality in more depth
    - Issue: vendor may try to reduce productivity, final price not known in advance

Fixed price: Contractual agreement on result and its value

- Ex, buy a house, pay X Euro
    - Issue: price is known in advance, vendor may try to reduce quality
    - Issue: quality should be 'perfectly' described in technical annex to contract

Define 'network effect' (or demand side economy of scale) and give an example of it.
Value of service depends on number of users and grows way more than linearly with number of users.
Ex social network.

Describe the concept of 'economy of scope' and provide an example.
Share fixed costs on a larger variety of products (vs economy of scale, share fixed cost by increasing the production of same product)
Ex: Amazon selling a large variety of products

List the key factors to consider in selecting a software product to support an IS

- SW Features:
  Critical functionality, Important functionality, Nice-to-have functionality, Productivity features, Cost-saving features
- Vendor Stability:
  Size (Revenue, Support staff, Number of clients), Years in business, Location, Strategic plans, Investment in R&D
- Costs:
  Software license, Software implementation, Software support, Hardware requirements cost, Hardware maintenance, Other costs, Additional features options, Data migration cost, TCO (Total Cost of Ownership)
- Implementation:
  Time to implement, Implementation track record, Implementation processes and tools, Training capabilities, Documentation
- Support:
  Support hours, Support response time, Online Help, Documentation, Level of support expertise and experience
- Technical:
  Ability to customize functionality, Data migration, Ability to add new reports, ReportWriter capability, Integration with other SW products, Productivity features, User interface look and feel, Ease of use, Flexibility of functionality, Hardware options , Security, Backups, Virus protection
- Product Stability:
  Uptime percentage, Scalability, Backup and recovery process
- Client Service:
  General impressions of vendor, General impressions of software, Responsiveness, Experience and skill level, Support processes and systems in place, Enhancement upgrades delivered timely, Enhancement upgrades address user needs
- Reference Checks:
  Software feature/function, Software usability, Verified key feature/functionality, Software flexibility, Vendor responsiveness, Vendor expertise

What could be the hidden costs in an IT application outsourcing relationship?

- If current provider discontinues the product / service, or if quality too low.
- search for other product / provider (or cost of insourcing)
- convert data
- litigation

Explain the 'activity' dimension in outsourcing (IT infrastructure, application ..) . Provide an example for each case.
Describes which kind of activity/service when outsourcing: Infrastructure (ex disk space), Application (ex email), Business process (ex logistics).

Most manufacturing companies outsource IT at application level, and use for instance ERP products. Banks usually do not outsource IT, and develop internally most of the applications they use. Propose a reason that explains this difference.
IT is core to banks, that often prefer to develop internally to increase IT governance, and IT alignment. Security may also be a driver.

Consider insurance company of exercise 1. For which processes would you recommend outsourcing IT support, and why?
IT at level of infrastructure in principle could be outsourced (no strategic know how), but there are risks about breaks on operational business data and customer data.
IT at level of IT applications could be outsourced with less risks.
A reasonable compromise would be using commercial applications for all processes (Operations, marketing and sales, after sales service) on a private cloud leased by an external contractor.

What are the key factors to consider in the decision about outsourcing an IT activity?
The activity is a commodity vs is specific
The activity is related to a competitive advantage for the organization or not
The activity manages sensitive data or not
The activity can be described precisely and controlled (ie it is possible to define effective SLAs) Lock in is avoidable (there are more vendors for the activity and switching is feasible)
Cost and quality – cost should include visible (search, negotiation, contract) and especially hidden costs
The organization can loose the know how regarding the activity (and possibly regain it in case of insourcing back later).

The WATER company uses a module of an ERP package to manage technical activities (planning and monitoring of water connection jobs). Discuss if this decision makes sense or not.
Using an ERP is an outsourcing decision (support for technical activities is made through a package acquired outside, and not built internally)
The decision makes sense. The activity is not strategic, not unique, is a commodity, data is not sensitive

Describe the concept of IT alignment, and provide an example.
IT area must support organization strategy and IT governance deals with that. In that sense IT alignment is the key point.
In IT alignment the aspects to be considered are:

- Business strategy: Scope, Distinctive competencies, Business governance
- Organization infrastructure and process: Org structure, Processes, Skills
- IT strategy: Technology scope, Systemic competencies, IT Governance
- IT infrastructure and process: Architecture, Processes, Skills

Examples:
Retail bank1

- Strategy: attract customers with better services
- IS function: more budget to improve services at counter, web site, call center: delays, flexibility ..

Retail bank2

- Strategy: attract customers with higher interest rates, no frill services
- IS function: less budget to save money, less investment in front end

What are pros and cons, from the point of view of the State and its citizens, in outsourcing the management of the cadaster?

Pro: avoid technical issues in the IT management of cadaster. Possibly reduce further C_D_state Con: cadaster is very sensible data (privacy), risk of frauds and data leaks. Continuity of service is another risk (cadaster must maintain data and provide service 'in eternity').
Overall, it is probably better not to outsource.

What SLA (service level agreements) would you use to monitor and control the company managing the outsourced cadaster?

C_D_state (only for part relative to cadaster management, D_pay to D_close in activity diagram) LT_record

In the METROT case RFID cards to support ticketing are of two types: anonymous (for short life tickets) and personal (with picture and name of owner – for long term tickets). The production and customization of these cards is made by company CARDS-T. What SLA (service level agreements) would you use to monitor and control CARDS-T?

Unit price of card
Lead time (from order to delivery)
Conformity (number of defective cards / total)
Protection of privacy of data (names, pictures of customers)

In the previous case the hospital decides to outsource the IT infrastructure (all kind of computer equipment and network) to an external company, while keeps internally the development and operation of software.

Propose a few SLAs to monitor the outsourcing relation between the hospital and the external IT provider.
- cost per computer per year (with computer defined as: cpu clock > xGhz, ram > y GB etc)
- cost per network service per year (service defined as: bandwidth > zB/sec, latency < x sec) - availability of servers > 99.99%
- availability of client PCs > 99%

Considering the 3 outsourcing dimensions, place this outsourcing case over the 3 dimensions
Activity: infrastructure
Location: on site
Unicity: shared (commodity PCs and network)

the GYM case the management of the IS is completely subcontracted to an external IT company. GYM has only one employee that plays the role of CIO, overlooks to all IT needs of the company, monitors the operation of IT and interacts with the subcontract.

Propose a few SLAs to monitor the outsourcing relation between GYM and the external IT provider.
Cost of service per year
Availability of service
Protection of customer data

Considering the 3 outsourcing dimensions, place this outsourcing case over the 3 dimensions
Site: off site (servers and software personnel outside GYM) + in site (Pcs for personnel, card readers + turnstiles)

Unicity: not unique (commercial package to handle gym companies, with some customized parts)
Activity: infrastructure (servers) + application (to handle GYM) (remark it is not outsourcing of processes, processes are all handled by GYM employees)

The taxi company TXI owns and operates taxis. Besides, the company manages a call center that receives taxi requests, and dispatches them to taxi drivers. Recently TXI has introduced an app for smartphones. Customers can call the taxi using the app instead of the call center. The app is developed and operated by company TAXIAPP.
Characterize the outsourcing relation between TXI and TAXIAPP over the three outsourcing dimensions.
Unicity : probably a standard product, w some adaptation
Location: on premise of TAXIAPP (off site)
Service: it infrastructure + application

Define a few (max 3) SLAs to monitor the outsourcing relation from the point of view of TXI.
Cost of service (per year, or per unit) Quality of service (ex customer satisfaction) Reliability of service

A company develops internally its web site (that supports all information on its products plus ecommerce) and deploys it on a virtual machine rented by an external provider. Besides, it uses a complete call center operated by another company to provide assistance to customers for the ecommerce site. Characterize this case in terms of the 3 outsourcing dimensions.
Web application: Activity= application; location=onsite; unicity= dedicated
Hardware: Activity= IT infrastructure; location=offsite; unicity= shared
Call center: Activity= process; location=offsite; unicity= dedicated (the specific CRM service) + shared (the call center infrastructure and personnel)

Propose a few SLAs to monitor the relationship with the call center company:
% of satisfied customers
Unit average cost for an interaction with a customer
Average, min, max Time the customer must wait at telephone line before operator answers

Consider the process of point 1. The movie theater company has decided to use a web service from another company to support the ticketing process (and other processes). Frame this in terms of outsourcing axes.
Location: off site
Object: application, service
Unicity: shared

A small manufacturing company selects these options for their IS. Every employee has a laptop connected to a wifi network. No server is installed on premise, data space is purchased on the cloud, and an ERP / CRM product is used as a service. Frame this case in terms of the outsourcing dimensions.
There are different levels to be considered
- laptop, wifi: infrastructure, not clear from text if rental or acquisition, on site
- data space: infrastructure, not unique, offsite
- erp/crm: application, (probably) not unique, offsite

A manufacturing company has an engineering department. Here engineers use a program like Autocad (produced by AutoDesk) for doing technical drawings. The engineers use PCs owned and maintained by the company. The technical drawings are stored on a cloud storage service like Dropbox. Frame this case in terms of the outsourcing dimensions.

Three objects must be considered: engineering program (Autocad), storage service (Dropbox), PCs

	object	unicity	location
Autocad - outsourced	Application	Not unique	On site
Dropbox – outsourced	IT infrastructure	Not unique	Off site
PCs - insourced	IT infrastructure	Not unique	On site

Consider the case of exercise 1. Frame the TO Be situation in terms of the outsourcing dimensions. Assume that the IT infrastructure (database of tickets, web site) is developed by company Z, all machines to run the application are owned and maintained by the city administration

	object	unicity	location
IT infrastructure - insourced	infrastructure	shared	On site
Application to manage tickets - outsourced	application	unique	On site