



INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
CASE STUDY: RED DRAGON TAXI COMPANY

For use in May and November 2013

INSTRUCTIONS TO CANDIDATES

- Case study booklet required for higher level paper 3 information technology in a global society examinations.

Foreword

The ITGS case study, *Red Dragon Taxi Company*, is the stimulus material for the research investigation required for May and November 2013 higher level paper 3. All of the work related to the case study should reflect the integrated approach explained on pages 15–17 of the ITGS guide.

Candidates should consider *Red Dragon Taxi Company* with respect to:

- relevant IT systems in a social context
- both local and global areas of impact
- social and ethical impacts on individuals and societies
- current challenges and solutions
- future developments.

Candidates are expected to research real-life situations similar to *Red Dragon Taxi Company* and relate their findings to first-hand experiences wherever possible. Information may be collected through a range of activities: secondary and primary research, field trips, guest speakers, personal interviews and email correspondence.

Responses to examination questions **must** reflect the synthesis of knowledge and experiences that the candidates have gained from their investigations. In some instances, additional information may be provided in examination questions to allow candidates to generate new ideas.

Overview

Dragon City is a small city of approximately 200 000 people in East Asia. There is one main taxi company, *Red Dragon Taxi Company*, which the owner Yao Chu's grandfather started with one taxi. Over the years the family run company has grown and is now the leading taxi company in the city, although there are other operators in a highly competitive market. There are ten people
5 working in the company who manage an increasing number of drivers.

Demand for taxis in Dragon City is rising and *Red Dragon Taxi Company* is expanding rapidly as a result of increased economic growth in the area. Yao Chu believes an increased use of IT will facilitate the planned growth of *Red Dragon Taxi Company* ensuring it continues to be the leading taxi company in Dragon City. Yao Chu realizes that unless the company upgrades its IT
10 they run the risk of being overtaken by other operators that are starting to use information and communication technologies.

Current IT system

At the present time the company controls about 150 taxis from a small office in the centre of the city, but not all of them are on the road at the same time. The company has a set of networked computers in the office as well as landline and mobile phone communications. Customers who
15 ring for a taxi have their request answered by one of the controllers in the office who then contacts a taxi driver on their mobile phone from a list of free taxis. Usually the drivers call in to be recorded as booked when a customer requests a taxi from the side of the street. If a driver does not call in, then the taxi will remain recorded as free, which has caused many problems.

The taxi requests are recorded in a shared spreadsheet on the office network with one worksheet
20 for each driver which is cumbersome to use. At the end of the day each driver returns to the depot to reconcile the jobs and money taken, and this data is entered into the spreadsheet as well. This system is highly inefficient. The company is making a profit but keeping track of expenses, profits, vehicle maintenance and driver wages is becoming very difficult, especially for drivers who own their own cars.

25 Processing the data in the spreadsheets to analyse taxi performance has been a problem and Yao Chu's son, who is studying Computer Science at university, has been experimenting with a prototype database application to import the spreadsheet data and produce weekly taxi and driver performance reports and more accurate wage slips. He has not completed the task.

30 The increased business is also causing problems with the current system not being able to handle the load efficiently. This is causing dissatisfaction among the customers with longer response times.

The range of problems is creating difficulties for the administration and threatens to undermine the expansion of the company, jeopardizing their market position.

Solution requirements

35 Yao Chu and his family are looking at procuring an integrated IT system that serves the following purposes:

Online booking management

The booking system needs to be able to offer a variety of services for customers and to manage bookings. Many of the features of the booking system will need to be able to be accessed on the company website and through the use of smartphones and the internet by customers.

- 40 The booking system needs to be able to:
- identify regular customers and their usual pick up and drop off address and to be able to display the address through a map look-up
 - provide the availability of taxis and their location, arrange for multiple pick-up, regular bookings, long term and multi-trip hirings, return trips, and a trip price calculator
- 45 • manage special vehicle hiring, eg for large numbers of customers, with large luggage capacity, special needs customers, and luxury taxis
- monitor bookings to prevent overbookings and possible overload of the taxi system during busy periods
 - handle different methods of accepting bookings such as by telephone, through the company website on the internet, by email, by SMS, or by using a smartphone app.
- 50

System interface

The system in the office needs to include graphical displays to make the management and monitoring of the taxis easy and quick. These will display information about taxi location, bookings, job tracking, and traffic updates which can be communicated to the drivers in their taxis as well.



[Source: <http://www.taxi-track.com/>, April 2012]

55 *Dispatch*

A dispatch system is needed that can allocate taxis, either automatically or manually. The system also needs to be able to display the location and status of each taxi and the progress of each journey. This can be done using taxi location equipment based on GPS and other information sent back to the office using communications and monitoring systems.

- 60 The dispatch system needs to be able to communicate to the customer the time they can be expected to be picked up, and to alert the customer if there are any delays.

Journey optimization

Taxis need to be available throughout the city to minimize the response time. The system needs to be able to monitor the location of taxis in the city.

- 65 *Red Dragon Taxi Company* is also looking for software that will help with planning of the routes taxis should take, especially one that can help with minimizing the waiting time for pick-ups.

As the city is growing, an increasing challenge will be the ability to locate new and changing pickup points and destinations.

Inside the taxi

- 70 As well as fare calculation equipment, the taxi needs to have these systems installed:
- a visual and voice guiding GPS navigator with built-in maps and text display of information
 - a variety of communications systems between the dispatch centre and the driver
 - vehicle tracking and data logging equipment
 - driver and customer safety equipment such as CCTV.

75 *Control centre management*

The control centre will have a customer account manager who is responsible for:

- managing credit card and other payment methods by customers
- production of regular customer invoices
- recording and management of taxi maintenance and usage
- driver activity statements.

Challenges faced***Project management and system procurement***

The company wants the system to be in place by July 2014. They are concerned that not all the requirements can be met by this date, and that they may need to prioritize the implementation of the features.

- 85 The IT system needs to be secure, easy to use and maintain, and be scalable as the company expands. The cost of the new system must be able to be justified from the benefits it will provide. Also there are other considerations:
- Yao Chu has become more aware of the different types of systems available, both off-the-shelf and customized, from a variety of providers, and needs to make a decision about which type of system/s and which provider/s to use, especially with the continued rapid growth that is being foreseen.
 - Some systems require the setting up of the system in-house and some can be outsourced in a variety of ways, which is attractive since no one in the company has much expertise in IT.

System requirements**95 *Data management***

The new system at *Red Dragon Taxi Company* needs to be capable of collecting and storing information about the company's customers. This would enable the company to keep in contact with those customers and allow it to offer incentives and special rates and services. The company may also choose to share customer information with other businesses for marketing purposes.

100 This information could include which customers have been put on a blacklist .

Many of the systems being considered have the capability of analysing and sharing the data stored about customers and drivers as well as the times and locations of trips made. *Red Dragon Taxi Company* is considering the purchase of business intelligence software to enhance this capability, but is not certain of the benefits and implications for the company.

105 *Communication and booking management*

The company is investigating different methods of communications between the taxis, control centre and customers. The integrated communication and dispatch system must be compatible with the data management system that *Red Dragon Taxi Company* will implement.

110 The communications systems must be able to cope with unexpected events such as accidents, traffic jams and dangerous situations. Because of the possibility of these and other disruptions, as well as general performance issues, *Red Dragon Taxi Company* is investigating whether to use available communications systems for their communications or a dedicated system. The need to have communications maintained when the usual communication system fails for a variety of possible reasons is also a main consideration here. A variety of backup communications systems 115 and procedures needs to be investigated.

Surveillance

The management of *Red Dragon Taxi Company* has announced that CCTV equipment will be installed to monitor the activities in the taxi in the interests of driver and customer safety. GPS and GPRS will also provide the location of the vehicles. However, this raises concerns from 120 the drivers about employee monitoring. Different monitoring systems are being investigated.

Also, *Red Dragon Taxi Company* is regularly asked by the police and other authorities for information about customers and their journeys. The information in the system needs to be held for up to two years.

Specific information technology items, additional to those in the ITGS guide, which are associated with the *Red Dragon Taxi Company*

Behavioural marketing
Business intelligence software
CCTV
Cost benefit analysis
Cost estimation
Customer management software
Data logging
GPRS
GPS
Route planning software / route optimization
Smartphone apps
Smartphone
SMS
Software as a service (SaaS)

Any individuals named in this case study are fictitious and any similarities with actual entities are purely coincidental.
