1. Innovation of Knowledge intensive service

According to Den Hertog and Bliderbeek (1999), there are four dimensions of service innovation as shown in Figure 1. On dimension 1, new service concepts differentiated from existing and competing services are proposed. For example, in financial service, ATMs are commonly installed for customers to withdraw cash from. If a bank enables its customers' smart phones to scan checks to deposit their checks into their bank accounts, it is a new service concept that may differentiate its service from competitors. On dimension 2, a new client interface, such as smart phone, could meet the bank's customers' characteristics that they are smart phone users and have no time to go to bank offices to deposit checks. On dimension 3, a new service delivery system mainly refers to the organizational or service ecosystem that composes stakeholders in delivering the services. Therefore, a new business process needs to build in the bank in order to process and validate the scanned checks. On dimension 4, new technological options are chosen to realize the new service concept by scanning checks using customers' smart phones. Thus, the new service system is built on internet using smart phone apps.

Take knowledge intensive service as an example. A service provider offers knowledge intensive services by completing tasks that need professional knowledge but its clients may not possess or have no capacity. For example, an agency helps its client companies to file patents for its client's invention. The professional knowledge to file patents is what the agency possesses that benefits its clients. The agency's offerings are treated as knowledge intensive services.

Figure 2 shows the SECI model proposed by Nonaka and Takeuchi (1995) that describe the cycle of knowledge creation and transformation between tacit and explicit knowledge. Internalization is the process that explicit knowledge is absorbed and embedded as a person's capability to solve problems. Socialization is the process that people catch each other's tacit knowledge while they collaborate in completing tasks. Externalization is the process that people codify their knowledge in the forms that others can understand it without the knowledge owners' physical presentation. Thus, the knowledge artifacts in such forms as text, video, audio, etc. can be distributed via media.

Then, the variety of distributed knowledge artifacts can be perceived by people who have the intention to integrate the knowledge from these artifacts. This integration process is called combination. The cycle of knowledge creation can be performed from individual, group to organizational levels.

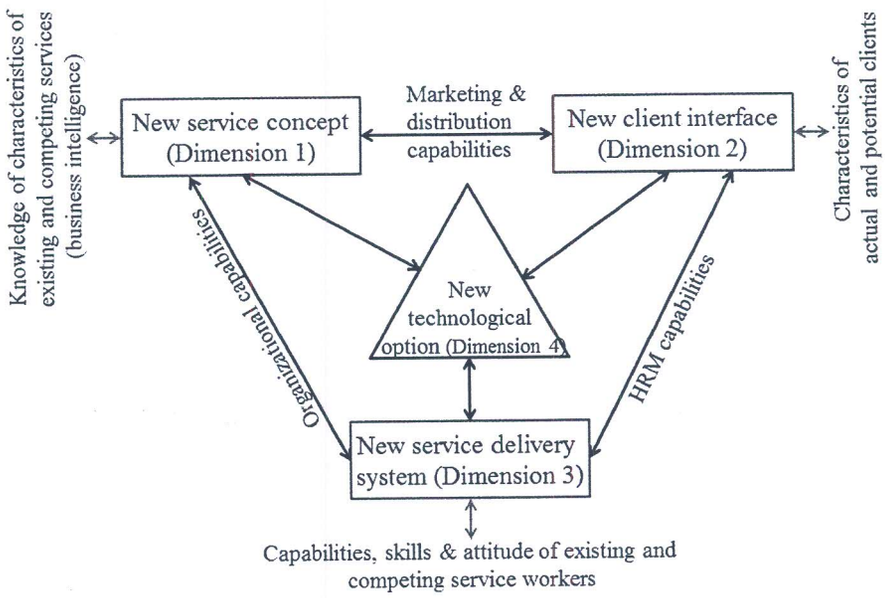


Figure 1. A four dimensional model of service innovation (Den Hertog & Bliderbeek, 1999)

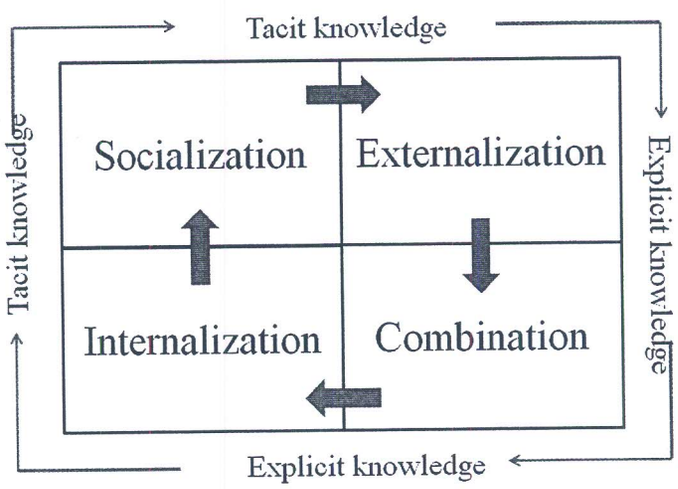


Figure 2. A knowledge creation process: SECI Model (Nonaka and Takeuchi, 1995)

With the description of the four dimensional model of service innovation, SECI knowledge creation model, and knowledge intensive service, you are expected to answer the following questions.

(1) Take your own learning experience in college as an undergraduate student. In your university, please identify agencies that offer knowledge intensive services that you personally experienced. Among them, you can take one service from an agency affiliated with your university as an example to describe its service concept, service interface, service delivery process, and the technologies used. (10%) *Hint*: In general, agencies in a university offering knowledge intensive services include academic departments, research centers, library, counselling center, intellectual property and technology licensing division, etc.

(2) Take the service offered by the agency mentioned in question (1) as the target service for innovation. Through your prior experiences in using this service, please identify the gap between what you expected and what it delivered. Then, propose a new service that may mend the gap you perceived and create better experiences to meet your needs. Please describe your new service concept, new client interface, new service delivery system in terms of business processes, and your choice of technologies to realize the new service concept. (10%)

(3) Please describe the information system that you design to enable the new service offered by the agency in your university. You may model the proposed information system by diagrams, such as use case diagram for system requirement, entity-relation diagram for information, and system diagram for system architecture. (10%)

2. Technology Enabled Services

It has been widely experienced in the concept of sharing economy. For example, Uber and Airbnb were mostly mentioned recently. Uber app enables a person to serve as a driver using his/her vehicle to drive passengers who request the ride service via Uber app. Thus, the vehicle as the resource can be used by those who need rides, in which Uber provides the information to match riders and drivers, and also handles the cash flow for both.

Airbnb allows people who have spare space to rent for people who need place to stay. Airbnb provides the app for hosts and tenants to engage and co-create value. Both Uber and Airbnd erected platforms to enable service providers and demanders to benefit each other. Some people also call these service models as platform economy or two-sided market (Figure 3).

Take the living experiences you have in your communities, and tell us any values that could be created by building a platform using information technology, so that the residences in your community can enjoy better living quality. Please describe the service platform you tend to build to achieve the objectives of enhancing the living quality of the community you live. Please answer the following questions to elaborate the value co-created by both service providers and demanders via the platform.

(1) Please identify the value created and perceived by both sides. (5%)

(2) Please design the structure of information system that you plan to build to enable the platform service including the functional modules and data flows. (10%)

(3) In order to enhance the intelligence of the platform service, please propose a data analytic model that takes data in a certain level of details as inputs to generate results which can facilitate users to create higher value via the platform service. (5%)

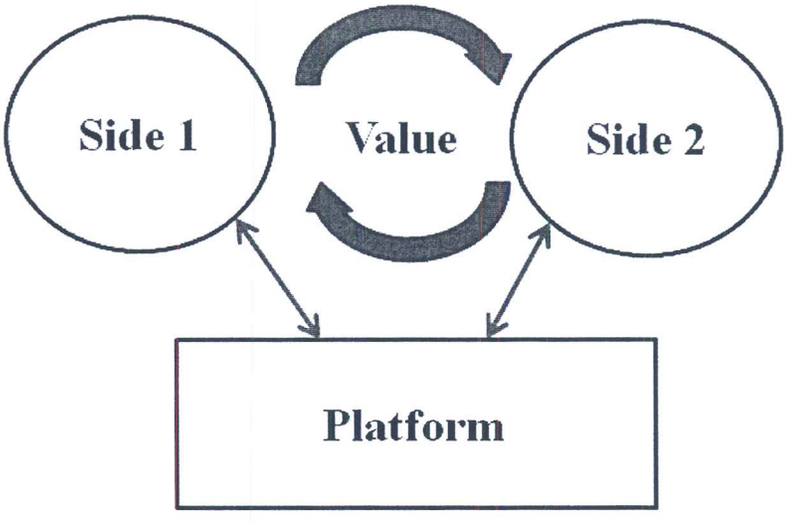


Figure 3. Platform Economy (Two-sided market)

國立清華大學 106 學年度碩士班考試入學試題

系所班組別：服務科學研究所 乙組

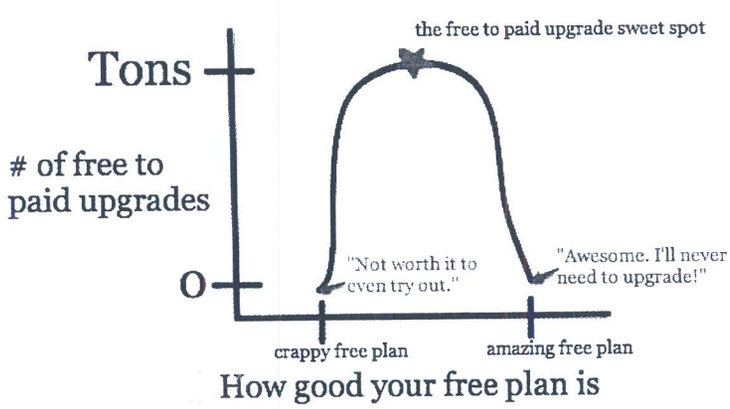
考試科目（代碼）：管理資訊系統（4801）

　　*請在【答案卷、卡】作答

3. IT application and strategy

(a) Please use a systematic framework (such as their technology features and applications) to illustrate the principal technologies and standards for wireless "networking" and "communication", respectively (10 points)?

(b) Your company plans to start using wireless technologies to improve supply chain efficiency and communication efficacy. What wireless technologies would you recommend to build a *wireless enabled supply chain system* and why (10 points)?

(c) *Technological (network) convergence* is the tendency that as technology changes, different technological system evolve toward performing similar tasks. Previously separate technologies such as voice (and telephony features), data (and productivity applications), and video can now share resources and interact with each other synergistically. Please list and explain two examples of *technological (network) convergence* (10 points).

(d) Because of the features embedded in the network convergence, *freemium* is a popular business model used in digital industries (software, telephone, movie etc.). Freemium provides basic version of products free of charge, while money is charged for premium version. Dropbox or Skype is a typical freemium example. However, not every companies work the freemium model successfully since conversion rates from free user to paying customer are typically very small (3%~5%). Many companies found the freemium strategy leaves them with thousands of freeloaders. Based on the following figure, please design a scientific study (an experiment) with detailed processes to decide the *free to paid upgrade sweet spot*? (20 points).