

## Chapter 2

# Information Systems for Competitive Advantages

This chapter will review competitive forces and competitive information systems strategies for gaining competitive advantages, explain concepts of value chain, value web and business ecosystems & co-opetition, and discuss innovation strategy.

### 2.1 Competitive Strategies

Gaining competitive advantage is critical for organisations. Baltzan and Phillips (2010, p. 16) define competitive advantage as ‘a product or service that an organization’s customers value more highly than similar offerings from its competitors’ (in other words, you have something useful (i.e. products, services, capabilities) that your competitors do not have). Competitive advantages are typically temporary as competitors often seek ways to duplicate the competitive advantage (Baltzan & Phillips 2010, p. 16). In order to stay ahead of competition, organisations have to continually develop new competitive advantages. This section discusses how an organisation can analyse, identify, and develop competitive advantages using tools such as Porter’s Five Forces, three generic strategies, and value chains.

Michael Porter’s Five Forces Model is a useful tool to assist in assessing the competition in an industry and determining the relative attractiveness of that industry. Porter states that in order to do an industry analysis a firm must analyse five competitive forces (Baltzan & Phillips 2010, p. 17):

- Rivalry of competitors within its industry
- Threat of new entrants into an industry and its markets
- Threat posed by substitute products which might capture market share
- Bargaining power of customers
- Bargaining power of suppliers.

To survive and succeed, a business must develop and implement strategies to effectively counter the above five competitive forces. O’Brien and Marakas (2011, p. 49) suggest that organisations can follow one of five basic competitive strategies, which are based on Porter’s three generic strategies of broad cost leadership, broad differentiation, and focused strategy. The five competitive strategies are: cost leadership, differentiation, innovation, growth, and alliance. Meanwhile, information systems could be a critical enabler of these five competitive strategies (see Table 2.1).

Table 2.1: Competitive Strategies & Roles of Information Systems

Competitive Strategy	Roles of Information Systems
Cost Leadership	Organizations can use information systems to fundamentally shift the cost of doing business (Booth, Roberts & Sikes 2011) or reduce the costs of business processes or/and to lower the costs of customers or suppliers, i.e., using online business to consumer & business to business models, e-procurement systems to reduce operating costs.
Differentiation	Organizations can use information systems to develop differentiated features or/and to reduce competitors’ differentiation advantages, i.e., using online live chatting systems and social networks to better understand and serve customers; using technology to create informediaries to offer value-added service and improve customers’ stickiness to your web site/business(Booth, Roberts, and Sikes 2011); applying advanced and established measures for online operations to offline practices (i.e., more accurate and systematic ways of measuring efficiency and effectiveness of advertising) (Manyika 2009).
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Competitive Strategy	Roles of Information Systems
Innovation	<p>Organizations can use information systems to identify and create (or assist in creating) new products and services or/and to develop new/niche markets or/and to radically change business processes via automation (i.e., using digital modelling and simulation of product design to reduce the time and cost to the market (Chui &amp; Fleming 2011). They also can work on new initiatives of establishing pure online businesses/operations. At the same time, the Internet and telecommunications networks provide better capabilities and opportunities for innovation. “Combinational innovation” and Open innovation are two good examples. There are a large number of component parts on the networks that are very expensive or extremely different before the establishment of the networks, and organizations could combine or recombine components/parts on the networks to create new innovations (Manyika 2009). Meanwhile everyone is connected via personal computers, laptops and other mobile devices through cabled Internet or wireless networks or mobile networks, there are plenty of opportunities to co-create with customers, external partners and internal people.</p>
Growth (including mergers and acquisitions)	<p>Organizations can use information systems to expand domestic and international operations or/and to diversify and integrate into other products and services, i.e., establishing global intranet and global operation platform; establishing omni-channel strategy to gain growth(omni-channel strategy looks at leveraging advantages of both online (or digital) and offline (or non-digital) channels) (Rigby 2011).</p>
Strategic Alliance	<p>Organizations can use information systems to create and enhance relations with partners via applications, such as developing virtual organizations and inter-organizational information systems.</p>

(Source: Developed from O’Brien and Marakas 2011, pp. 49–51; Manyika 2009; Chui and Fleming 2011; Rigby 2011; Booth, Roberts, and Sikes 2011; The Authors’ Own Knowledge)

On top of these five basic strategies, companies can also adopt other competitive strategies facilitated by information systems to shape their competitive advantage. Some examples include (O'Brien & Marakas 2011, p. 50–52; Chui & Fleming 2011; The Authors' Own Knowledge) are:

- Locking in customers or suppliers by enhancing relations and building valuable new relationships via customer/partner relationship management systems/ applications (i.e., providing a bank's customers with multiple touch points via telephones, Internet, fax machines, videos, mobile devices, ATMs, branches, the bank's agents).
- Building switching costs via extranets and proprietary software applications (i.e., Amazon's user-friendly and useful B2C website and Alibaba's B2B platform) so that a firm's customers or suppliers are reluctant to pay the costs in time, money, effort, and bear the inconvenience of switching to a company's competitors.
- Raising barriers to entry through improving operations or/and optimizing/flattening organizational structure by increasing the amount or the complexity of the technology required (i.e., Google's search engine and P & G's digitization strategy/efforts-P & G is working on digitizing almost every aspect of its operation to make it the world's most technologically enabled firm).

## 2.2 Value chain

Another important concept and tool that can help a business identify competitive advantage and opportunities for strategic use of information systems is Porter's value chain model. The value chain approach views an organisation as a chain, or series, of processes, and it classified an organization's activities into two categories: primary activities (i.e., inbound logistics, operations, sales & marketing, customer service, outbound logistics) and secondary/support activities (i.e., administration, human resources, technology, procurement) (O'Brien & Marakas 2011, p. 56; Laudon & Laudon 2012, p. 135). The value chain helps an organisation determine the 'value' of its business processes for its customers. The model highlights specific activities in the business where competitive strategies can be best applied and where information systems are most likely to have a strategic impact. By creating/adding value and thus creating competitive advantages, information systems could contribute to each part of an organization's value chain and extended value chain (including interactions/ties with external partners and strategic alliances). By leveraging on the Internet technologies, organizations could also create a value web (Laudon & Laudon

2012, p. 137) or a hub structure, both of them look at improving the efficiency and the effectiveness of value chain and supply chain by digitally connecting customers, suppliers, partners; by reducing the information gaps/errors along the chain (especially demand and supply); and by bettering communication, cooperation and collaboration.

### **2.3 Business Eco-systems and Co-opetition (Competition & Cooperation)**

In today's digital era, firms need to have a more dynamic view of the boundaries among firms, customers, and suppliers, with both competition and cooperation occurring with members of the industry set (more than one industry) (Laudon & Laudon 2012, p. 140). For example, car, plane, bus, train are in the same industry set of transportation. Another example is the way that traditional universities are now competing with online learning and other training and development firms.

Business eco-systems refer to "loosely coupled but independent network of suppliers, distributors, partners and strategic alliances (Laudon & Laudon 2012, p. 139). An excellent example of business eco-systems is the mobile Internet platform; industries such as mobile device manufacturers, software vendors, online services firms, Internet services providers are working together. Meanwhile in order to stay ahead of the competition, organizations need to actively establish their business ecosystems. For example, looking at the competition between Apple and Samsung, it can be said that Samsung is still very much a hardware player while Apple has been developing its ecosystem and venturing into areas of hardware, software, service, content and customer support in recent years (Wagstaff 2012). So who is doing better now?

Another term reflects the same meaning is "Co-opetition". In order to succeed in today's highly competitive market, firms also should practice 'co-opetition' since not all strategic alliances are formed with suppliers or customers. Co-opetition is a strategy whereby companies cooperate and compete at the same time with their competitors, complementors (i.e. hardware and software businesses), customers, suppliers (Pearlson & Saunders 2004, p. 52). Through co-opetition, the best possible outcome for a business can be achieved by optimally combining competition and cooperation. A good example is Covisint (<http://www.covisint.com/>), which is the auto industry's e-marketplace and is backed up by competitors of GM, Ford, Daimler Chryslers and others. Benefits of Covisint include speed in decision-making, reduced supply chain costs and greater responsiveness in serving customers.

The downside to co-opetition is that it may be viewed as collusion. Many countries have legislation in force to deter anti-competitive or price-fixing practices. The Australian Competition & Consumer Commission (ACCC) in Australia has imposed huge monetary fines on companies and the directors of those companies found guilty of anti-competitive or price-fixing practices.

## **2.4 Innovation Strategy**

### **2.4.1 *Open innovation strategy***

Open innovation emphasizes an organization's efforts of engaging and collaborating with external sources and its partners in its innovation process (Lichtenthaler, Hoegl & Muethel 2011). The telecommunications networks and Internet technologies have made the open innovation more appealing to organizations. Open innovation strategy has been adopted by many most innovative companies in the world. For example, 3M has been very successful in developing smart products via its open innovation approach-10,000 R &D people in 73 locations from 63 full-scale operating businesses across dozens of industries work together as well as working with large number of external partners via 300 joint programs and customers via 30 customer technology centers around the world (Jaruzelski, Holman & Baker 2011).

One of the biggest barriers to promote open innovation in the organization is to do with employees' attitudes of not-invented here and not-sold-here, some strategies to deal with such attitudinal tendencies include (Lichtenthaler, Hoegl & Muethel 2011):

- Clearly communicating open innovation strategy across the organization, especially the benefits of opening up the innovation process to outside expertise.
- Demonstrated top management support: senior executives have to be champions and role models of open innovation strategy and simply providing lip services is not going to work.
- Establishing incentive/reward systems: need to reduce the traditional emphasis on internal-only innovation process and develop both monetary and non-monetary reward mechanism (i.e., granting open innovation award, providing opportunities to work in the partner organization for some time (especially in a different location/country) for open innovation practice.
- Fostering pro-open innovation environment by working on organizational culture and structure.

One of the excellent/prominent examples or leaders of successfully implementing open innovation strategy is Mozilla Corporation, which has developed an open-source and free web browser: Firefox (currently at its 14.0.1 version and accounts for more than 24% of web browsers market) (Wikipedia 2012). It has extensively relied on external people (a broader group of volunteers) outside the firm for creative ideas, development of products, and decision making (in fact the number of outside contributors is much larger than that of internal people). What are some recipes for Mozilla's huge success of open innovation strategy? Michelle Baker, Chairperson and former CEO of Mozilla Corporation provide with some answers (reported in Mendonca & Sutton 2008):

- Effectively managing the mode of participation: setting up frameworks where people can get involved in a very relaxed/decentralised way; having discipline in certain areas (i.e., programming codes going into the Firefox); putting quality control process in place; clearly specifying where input is needed; giving people the feeling of ownership thus inspiring their desire for creating an open, participatory and safe Internet.
- Balancing internal people and outside volunteers: you need both groups. Without the former Firefox won't be an established force while without the latter the Firefox project won't last for long.
- Having transparent and distributed decision-making process: decision-making process is unrelated to employment status (non-employees can also take part in the decision-making process).
- Having the confidence that giving people control or voice in an elegant manner can create innovations and generate good opportunities (even revenue).
- Open management style: giving up some control and turning people loose (of course you need to figure out appropriate space and range) could bring in great results beyond expectation. Leaders of the organization also need to have the courage to acknowledge they are not perfect and admit when they are wrong!

At the same time, by drawing on the experiences of successful open-source innovation initiatives (i.e., Wikipedia, ATLAS particle detector, Firefox web browser, Sun Microsystems' Solaris operating systems, and others), Bughin, Chui & Johnson (2008) present suggestions for effective open innovation management:

- Attracting and motivating co-creators/contributors: organizations need to effectively understand motivations of contributors and provide the right incentives to the right people. Participants are largely interested in making a contribution and seeing it become a reality. And many contributors do enjoy non-financial rewards, such as fun, fame/recognition, and

altruism. Trust and brand affinity are also important influencing factors. People generally don't want to work with brands/firms they don't trust or like.

- Appropriate structure for participation: projects/problems need to be broken down into smaller ones and let contributors work parallel on different pieces.
- Having governance mechanism to facilitate co-creation: clear rules, leadership, and transparent processes for setting goals and resolving conflicts should be established and clearly communicated.
- Quality assurance: a quality assurance process should be put into place.

In addition, managing risks of open innovation is another critical issue. One typical risk is intellectual property (IP). Organizations need to clearly understand potential IP risks and the investments/costs associated with identified risks, and could take measures such as establishing IP sharing agreement or/and rewards/risks sharing arrangement to deal with IP issues (Alexy & Reitzig 2012; Bughin, Chui & Johnson 2008). Updating & maintaining open source code and providing technical support to users are also needed to be looked at (Pearlson & Saunders 2010, p. 340).

#### 2.4.1.1 *Google's way of innovation management*

Google is one of leaders in innovation management. What are some of its best practices? Google's Executive Chairman and former CEO Eric Schmidt provides us with some insights (reported in Manyika 2008):

- Believing the notion of wisdom of crowds argument: groups make better decisions than individuals, especially when the group are selected to be among the smartest and most interesting people.
- Having different views and always questioning/challenging established ways of doing thing: how can we do in different and better ways?
- Imposing a deadline: a good combination of flexibility and discipline is required, and both of them are essential.
- Perfecting the art of encouragement: we believe "the best ideas don't come from executives".
- Providing people with time for new ideas: we allocate 20% time for people to pursue their ideas.
- Having small and undirected teams for innovation and give people space and time for thinking and reflection: we believe "innovation always has been driven by a person or a



small team that has the luxury of thinking of a new idea and pursuing it. . . Innovation is something that comes when you are not under the gun. . . .”

#### *2.4.1.2 Amazon’s way of innovation management*

Amazon, which developed the innovated and most successful B2C e-commerce model, is another great example of innovation management. Some things organizations can learn from Amazon regarding innovation management include (Dumont, Kaura & Subramanian 2012: The Authors’ Own Knowledge):

- Having business systems (can be easily broken into simpler sub-systems) and architecture (could be organized by simply plugging in modules and components) designed for rapid product development and quick responding to changes: Amazon has been successful in venturing into different areas and dealing with huge number of customers without diminishing service quality
- Having customer-centric mind-set: Amazon and its Zappos.com are examples of customer centric business-they provide what customers want and even beyond that. . .
- Having a good balance between control & speed and between vertical & horizontal integration to achieve differentiation and accelerate product cycles as well as venturing into new areas (especially adjacent markets).

#### *2.4.1.3 Apple’s way of innovation management*

It could be argued that Apple’s way of innovation management centres on two perspectives:

- Steve Job’s innovation leadership
- User experience innovation developed through innovative product designs

### ***2.4.2 When does it make sense to be an early IS/IT adopter?***

Another important and highly debated topic in innovation strategy management is when organizations should be early adopter of new technologies. Companies like eBay (online auction), Yahoo (Internet directory), and Apple computer (software/hardware) ‘got there first’ and leveraged their first-mover/early adopter competitive advantage. Companies such as Citibank (ATM), Sony (video tape), Chemdex (B2B digital exchange), Netscape (Internet browser), lost their first-mover advantages to late movers. Intel (microchip), America Online (Internet marketing), and Google (online search engine) are some good examples

of companies who were later movers but gained success over earlier adopters by being the best (Turban *et al.* 2006, p. 592).

The first mover in an industry has the advantage of being the first to offer a product or service to the market. This can help create an impression that the firm is the pioneer or the initiator in the customer's mind. In addition this firm will be able to capitalise on the demand for the product or service until another firm enters the market (Turban *et al.* 2006, p. 591). However, first movers take the risk that new goods and services may not be accepted by the market. Some suggested factors that determine the success or failure of the first mover strategy include (Turban *et al.* 2006, p. 591):

- Size of the opportunity: big enough opportunity for just one firm and the company is big enough for the opportunity
- Commodity products: simple enough to offer but hard to differentiate, i.e. books and airline seats. Products such as clothes and restaurants are more easily differentiated by later movers with better features and services encouraging a switch to late movers.
- Be the best: in the long run, best-mover advantage not first-mover advantage determines the market leader, such as Apple's iPhone, Google's search engine, Amazon's e-commerce platform.

In the long term, organisations have to keep on being innovative and investing in research and development (R & D) to stay ahead of the competition or even survive in the market. In fact, firms who are very active in innovation and seriously invest into their R & D are top performers. Some top spenders on R & D include: Toyota, General Motors, Ford, Honda, Volkswagen in the Auto industry; Pfizer, Johnson & Johnson, Roche Holding, GlaxoSmithKline, Novartis, Sanofi-Aventis, AstraZeneca, Merck in the Health Care industry; Nokia, Samsung, IBM, Intel, Panasonic, Cisco Systems in the Computing and Electronics industry; Microsoft in the Software and Internet industry, and Siemens in the Industrials sector (Jaruzelski & Dehoff 2008; 2010; 2011; Jaruzelski, Loehr & Holman 2012). On the other hand, it is argued the success in innovation isn't really about how much money you spend but about how you spend (you need to spend wisely so you do better with less). For example the most innovative firms identified in the 2010 & 2011 Global Innovation 1000 study (reported in Jaruzelski & Dehoff 2011 and Jaruzelski, Loehr & Holman 2012 respectively) (such as in 2010 Apple (invested US\$ 1,782 million/ 2.7% sales revenue into R & D activities), Google (3,762 million/12.8%), 3M (1,434 million/5.4%), and GE (3,939 million/2.6%); and in 2011 Apple (US\$ 2.4 billion/2.2%), Google (5.2 billion/13.6%), 3M (1.6 billion/5.3%), Samsung (9.0 billion/6.0%) are serious about investing

into R & D but they are not top spenders on R & D (such as in 2010 Roche Holding (9,466 million/21.1%), Pfizer (9,413 million/13.9%), Novartis (9,070 million/17.9%), Microsoft (8,714 million/14.0%; in 2011 Toyota (9.9 billion/4.2%), Novartis (9.6 billion/16.4%), Roche Holding (9.4 billion/19.6%), Pfizer (9.1 billion/13.5%)). Other factors influencing the success of innovation management include (Jaruzelski & Dehoff 2010; 2011; Jaruzelski, Loehr & Holman 2012): top management's innovation skills and attitude, innovation process (including effective management of ideas generation and the process of from idea generation to product development), alignment between innovation strategy and business strategy, and pro-innovation culture (i.e., strong customer focus and customer experience orientation, passion and pride for products and services offered). Among these five factors, top management's innovation skills and attitude is the most important one. If top leaders are not willing to and not good at innovation, then the chance of the success of organizational innovation efforts will be very slim, and they will not take the lead or do a good in developing innovation culture, establishing innovation process, and pushing the alignment between innovation strategy and business strategy.

While established brands do help organizations in the marketplace, it is the continuous innovation efforts have provided them with sustainable growth and competitive advantage. It is particularly true in some industries (such as media and publishing- many examples of failed traditional news and referencing materials publishers as a result of emerging digital content providers (i.e., Wikipedia, Google, Youtube and many others online players). Meanwhile when we are talking about innovation, we are referring not only to R & D for new products but also to changes and new things in the various parts of the business, such as business processes, customer services, marketing & sales, training & learning, talent management, knowledge management, data collection & decision-making, design of organizational structure, intra-organizational & inter-organizational communications, procurement, payment systems, logistics management, among many others.

Furthermore organizational learning (especially open learning) could be viewed as an important element of innovation, without effective and continuous learning and quick responses to market changes, organizations won't be able to have the skills and knowledge for creative ideas. It can be said that even though the success and failure of the business is a result of multiple factors including management issues (such as leadership, management experiences and skills, decision making process, investment strategies), organizational factors (such as culture, structure, processes, people's skills), changes in the industry and in the marketplace, and economic conditions, the ability and commitment to continuous inno-

vation are definitely critical to the sustainable competitive advantage and long-term growth of the organization.

In fact, innovation is the source of the added-values and profits, for example Chinese manufacturers working on OEM orders typically make very slim margin while the owner of the intellectual property owner does much better. If an organization is able to make its innovation accepted as industry standard, then competitive advantages and good financial outcomes will be flowing in easily-just looking at the competition between Google's Android operation system and Apple's iOS (iphone operating system) for mobile devices.

Furthermore when we are talking about using IS/IT for innovation, IS/IT alone won't be enough for successful innovation, and it is a joint effort of IS/IT and business (users), which needs a top-down push to deal with silo problems and foster cooperation (Roberts & Sikes 2011). On a related note, Kleiner (2012) argues that only a few firms (i.e., Amazon, Apple) have successfully locked down their intellectual capital (technological information), and most companies hope that the speed of innovation beats the risk of leaking information to competitors. Continuous innovation could be used for dealing with intellectual property issues.

## 2.5 Summary

In this chapter an important dimension of information systems, identifying competitive advantages and enhancing competitive strategies through information systems, was discussed. Organisations can apply tools such as Porter's five forces and value chain to analyse their competitive position, examine their competitive advantages, and identify relevant competitive strategies. Information systems can play a very important role in the success of organisation's competitive strategies. However competitive strategies alone cannot create magic. In order to meet the 'IS/IT's unmet potential', both IS/IT and non-IS/IT executive need to work hard to have better understanding each other's areas (Roberts & Sikes 2008). The transparency in the planning and execution of information systems projects should be visible to business leaders. Accountability of information systems projects should be applied to both information systems and business parts in the organisation. In the next chapter, planning and evaluating information systems will be discussed.

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