Strategy

2

2.1 What the Reader Will Learn

- That strategy can mean different things to different people; consequently there are several 'schools' of strategy, some of which are highly prescriptive, others that are more organic.
- That the model of strategy most commonly used, the Rational Model, involves three distinct stages; an assessment of the firms strategic position, an evaluation of the strategic directions open to the firm and, lastly, implementation of the chosen strategy
- That big data may impact both the strategic direction the company chooses and the way the company creates its strategy
- That big data has implications for analysis frameworks such as; PESTEL, Porter's 5-forces and the Value Chain
- That aligning business and IT strategy is problematic, though frameworks such as the Applications Portfolio Matrix are useful in establishing which applications are strategic and which are operational

2.2 Introduction

Michael Porter (more of whom later) is fond of saying, "The essence of strategy is choosing what not to do" (Magretta 2012). Taking his advice we will specify at the outset what this chapter is NOT:

- This chapter is not an 'Idiots Guide' to strategy – There are several 'schools' of strategy, each with its own advocates and critics. To understand the full complexities and paradoxes of strategy requires an understanding of these different perspectives, something that is unachievable within the confines of a book chapter.

P. Lake, R. Drake, *Information Systems Management in the Big Data Era*,
Advanced Information and Knowledge Processing,
DOI 10.1007/978-3-319-13503-8_2

- This chapter is not an overview of all strategic analysis tools available: Given the focus of this book, this chapter will examine a sample of those tools and frameworks that are particularly influenced by "Big Data".
- This chapter will not discuss organisational expectations, stakeholders or culture – These will be covered, in a big data context, in the chapters on Style and Skills

Strategy is concerned with an organisation's direction for the future; its purpose, its ambitions, its resources and how it interacts with the environment in which it operates. As you will discover, strategy is complicated by the fact that there is considerable disagreement between researchers on the subject. If you work for an organisation that manufactures and/or sells products, you should find it easy to relate the tools and frameworks to your organisation. However, if you work for the public sector, a service organisation or a not-for-profit organisation you may find the language used in the models unfamiliar. That does not mean that these models are of less value to you, simply that you will need to adapt them to fit your own organisation and its environment.

We will investigate the consequences of Big Data for the strategy development process and its potential to inspire new, information-driven strategies. Big Data is often defined by three attributes; Volume, Velocity and Variety, all of which have implications for strategic analysis and strategic direction. The promise of comprehensive data granularity, broad transparency and fast, often real-time, information transfer offers the potential to create innovative business models and create unique competitive advantages. Finally, while many commentators have stressed that big data is not about technology, we believe that, without technology as an enabler, big data would not be possible. For big data to facilitate strategy, a company must have a robust technical environment and achieving this, while maintaining strategic flexibility, is not a trivial accomplishment. In this chapter we will discuss the challenge of aligning IT/IS strategy with business strategy and offer some tools and frameworks for you to investigate.

2.3 What is Strategy?

Since the term was first applied to companies in the late 1970s, books and articles claiming to define strategy and specify how it should be developed have flooded practitioners and students. These definitions have incorporated everything from analytic exercises and five-year strategic plans, to brainstorming sessions and simple vision statements. Consider the following definitions:

> Strategy is the direction and scope of an organisation over the long term, which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations. (Johnson et al. 2007, p. 9)

> Strategy is always, and I mean always, lucky foresight. Strategy is always serendipity. Strategy is always the product of a complex and unexpected interplay between ideas, information, concepts, personalities and desires. (Hamel 1997, p. 70)

Fig. 2.1 The rational model of strategy

> Strategy is not the consequence of planning but the opposite: its starting point. (Mintzberg 1994)
>
> Strategy is about stretching limited resources to fit ambitious aspirations. (C.K. Prahalad)

Clearly there is no universal definition of strategy. Some writers include the purpose of the organisation as part of the strategy while others make firm distinctions between the purpose and the actions that fulfil this purpose. Thus, the concept of strategy means different things to different people. Inevitably, this has led to considerable scepticism of strategy among many managers and executives.

Arguably the most common view of strategy (and the most taught on business courses) is what we will call the rational model of strategy. This can be depicted as follows (Fig. 2.1).

The rational model begins with an assessment of the current position of the company with respect to its business environment and its capabilities. Having determined the strategic position, the management of the company must then decide what they wish to achieve, e.g. what is their ultimate objective (often summarised in a 'vision' or 'mission statement'), and the direction they must take to achieve it. Strategic direction inevitably requires hard choices. Choosing a particular direction often means foregoing some opportunities in favour of others, and sometimes this may require a re-evaluation of the 'vision' or 'mission'. Choosing a particular direction may mean committing resources such as finance, which in turn may require the approval of stakeholders such as banks or external investors, and, again, a re-evaluation of the 'vision' or 'mission'. Finally, as management moves to implement its strategy, it may find resistance from its staff, its customers and/or its

suppliers. It may find that the business environment has changed, revealing greater opportunities or exposing serious threats to the business. Thus, the rational view of strategy, as a process that proceeds from Position to Direction to Execution, is overly simplistic. In reality the strategy development process must be data-rich, highly analytical, iterative, dynamic and, most important of all, inclusive. Unfortunately, many 'strategic plans' are announced with a fanfare of publicity, then left to languish in bookcases in the Executive Boardroom. These concepts are discussed later in this chapter.

Given its popularity in both business practice and business education, this chapter will focus on the rational model of strategy and the implications of Big Data – but why do companies need strategies in the first place? Firstly, organisations require strategy to define themselves, to set direction, and to manoeuver through threatening environments. Strategy is also needed to focus effort and to promote coordination of activity. Strategy both directs the attention of the individuals working within an organisation, and gives the organisation meaning for those individuals and for outsiders. Strategy also links the management of the firm's internal resources and its external relationships with its customers, suppliers, competitors and the economic and social environment in which it exists. Consequently, strategy is necessary to reduce uncertainty and provide consistency, which, in turn, gives a sense of being in control. However, some would argue that this 'sense of control' is illusory, that companies are complex systems operating within complex dynamic environments and that the level of complexity, as well as the rate of system change, will be different at different points in time. Put simply, it can be argued that complex systems, such as the competitive environment, require complex mental models of strategy and the use of rational mental models fails to address these complexities. In response to this view of strategy, several approaches have emerged, such as:

- Game theory
- Systems thinking
- Pure Complexity-based approaches; and
- Hybrid complexity-based approaches

Unfortunately these techniques are highly mathematical and require a significant amount of data. Consequently, they have, until now, failed to capture the imagination of executives in the Boardroom but, with the advent of big data, may prove to be the future of strategic thinking. But, or now, we will focus on the rational model of strategy development.

2.4 Strategy and 'Big Data'

Big data impacts both the strategy development process and the actual strategies developed in a number of ways, often called the 3-V's (Table 2.1).

Now, let's look at this in more detail. Clearly, how big data influences strategy, depends, first and foremost, on the strategic objectives it has been employed to achieve, the type of data being used and the stage of the 'big data lifecycle' the company is at.

Table 2.1 Implications of the '3-Vs' for strategy and the strategy process

The big data 3-V's	Strategy process	Strategies developed
Volume (the amount of data available)	Allows more detailed analysis of strategic position, possibly identifying underlying strengths and weaknesses	Allows greater optimisation of the supply chain and customer relationships. In some circumstances this may become the source of the firm's competitive advantage
	Allows alternatives to the rational model of strategy?	
Variety (the different types of data available e.g. structured, unstructured)	Allows a wider, more complete, analysis of strategic position, possibly identifying underlying opportunities and threats	Allows greater visibility of business relationships and the business environment previously outside the scope of traditional Management Information Systems (MIS). In some circumstances this may become the source of the firm's competitive advantage
	Allows alternatives to the rational model of strategy?	
Velocity (the speed at which data can be collected, analysed and distributed)	Allows faster, more timely, feedback on experimental strategic initiatives, possibly allowing some aspects of the strategy to be modified on-the-fly	Allows faster interactions with customers, suppliers, employees and other stakeholders. In some circumstances this may become the source of the firm's competitive advantage
	Allows alternatives to the rational model of strategy?	

All companies collect data – customer and supplier information, sales, purchases and other financial data, staff details, marketing information etc. Typically this is structured data suitable for storage on databases – we will call this ***transactional data***. In using this data many firms recognise what they are looking for and why they are looking for it. However, it is important to note that not all organisations can boast having an Enterprise Resource Planning (ERP) system, Customer Relationship Management (CRM) system, Supply Chain Management (SCM) system, Human Resource Information System (HRIS) and/or Management Information System (MIS). In some instances a company may be too small, have insufficient resources (financial or human), or simply not regard IT/IS as an operational or strategic priority. In others a company may have implemented, say an ERP system, poorly and (reluctantly!) be using a small selection of the functionality available. Yet others may have a number of disparate systems or functional silos that make the sharing of data problematic. In environments such as these the benefits of big data are unlikely to mature before the company addresses the more fundamental questions of:

- What data do we collect?
- Why do we collect it?
- How might we use it?
- How might we share it?

The companies that are in the early stages of the big data lifecycle are those that have structured databases that they can interrogate in order to improve operations

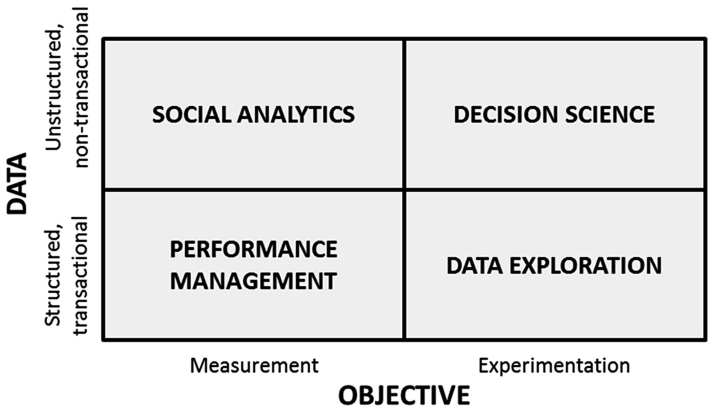

Fig. 2.2 Big Data strategies: What do we want from our data? (Adapted from Parise et al. 2012)

e.g. **Performance Management** (Fig. 1.1). For example, where managers can quickly identify changes in the profitability of customers (or market segments), assisting them to make short-term decisions and help with long-term planning, or systems that allow managers to use pre-determined queries and multi-dimensional analysis, that allow them to drill-down into the data. These systems are increasingly easy to use, have dashboard capabilities and allow multiple reports and graphs to make trends easier to spot.

Companies may then choose to investigate this data further. **Data Exploration** (Fig. 2.2) uses statistical techniques such as:

- A/B testing – to test against a control group to determine whether there has been an improvement based upon the test condition
- Cluster analysis – to group users/customers/suppliers. by similar attributes that may not have been previously apparent
- Data mining – to identify patterns in large data sets
- Predictive modelling – to predict user/customer/supplier behaviour based on previous transactions or preferences

Much of this work is experimental in that it may provide answers to questions that managers may not have considered. It may reveal customised marketing, cross-selling, up-selling or service opportunities to be directed to an important user/customer cluster. Conversely, it may identify groups of users that are unprofitable or groups that required different strategies to ensure retention.

As an alternative to Data Exploration, firms may choose to investigate the non-transactional data available in social media such as Facebook, Twitter and YouTube etc. This data offers scope to measure customer awareness (the exposure of social content, say, number of followers), customer engagement (the level of activity among members, say, amount of user-generated content) and reach (the extent to which content is distributed across other users and other social media

platforms, say the number of retweets on Twitter). Social analytics rarely offer direct financial measures and usually need to be correlated with web traffic and/or business data to offer meaningful insight.

Finally, the big data lifecycle reaches maturity as companies begin to use both structured and non-structured data for both measurement and experimentation. Arguably, the most difficult task is that of Decision Science using techniques such as:

- Crowdsourcing – getting services, ideas or content by soliciting contributions from a large group of people (usually and online community)
- Social network analysis (SNA) – viewing social relationships in terms of network theory, consisting of nodes (individuals) and ties (relationships) such as friendship, kinship, organisations etc.
- Sentiment analysis – used to determine the attitude of an individual or group to some topic
- Textual analysis – used to interpret texts (films, television programmes, magazines, advertisements, clothes, graffiti, and so on) in order to try and obtain an impression of the ways in which people make sense of the world around them

The term 'science' is used because much of this work requires the development of hypotheses similar to those required for scientific research. Using crowdsourcing Data Scientists may pose questions to a specific online community and, given community feedback, will determine the value, validity and feasibility of the ideas generated. For example:

> Threadless.com allows their community to submit and score designs. Artists from around the world submit designs, the Threadless community scores each design for seven days and the best designs are printed and sold. New designs are printed each week and the winning artists are paid royalties and cash prizes.
>
> LEGO Mindstorms is an online community that allows users to share and rate robot designs based around the LEGO MindStorms EV3 platform. This community has spawned the First LEGO League (FLL), a robotics programme for teams of 9 to 16 year olds who program an autonomous robot to score points on a thematic playing surface by creating innovative solutions to problems. The FFL currently host more than 20,000 teams in 70 countries.

Equally, using sentiment analysis, firms can quantify topics of interest around a particular product or service, say, changes in pricing, product features or design issues. For example:

> In 2010, shortly after the launch of the iPhone 4, Apple quickly became aware, via monitoring of social media, of a potential design flaw associated with the positioning of the internal aerial. Some users found that calls were being dropped if the handset was held in a particular way or gripped too tightly. Given this early warning, Apple avoided a costly $1.5 billion recall by offering early adopters of the device a free phone case and modifying the manufacturing process to rectify the error on later handsets.

These examples are just a few of the early business models that big data can facilitate, but how might big data impact the strategy process itself?

2.5 Strategic Analysis

To develop a business strategy it is essential to understand the organisation and the relationships that exist between the wider (macro) business environment, the industry-specific (micro) environment and the organisation's resources, capabilities and stakeholder expectations. While the direction of the firm is important to all organisational stakeholders, it is the executives and senior managers who decide upon the organisation's key objectives. Consequently, these are the people with the responsibility for reconciling the objectives with the business environment and the capabilities of the organisation.

2.5.1 Analysing the Business Environment

2.5.1.1 Introduction

The external business environment impacts an organisation at several levels, from the most general, to the most specific, though some factors may occur at all levels (Fig. 2.3). The most general, the macro-environment, may include political, economic, environmental, social, demographic and technological factors. At a more specific level are industry sector factors such as competition, product substitution, customer and supplier power. Finally, at the most intimate level, are the opportunities and threats posed within defined market sectors. In this section we will explore these different levels of business environment and some of the tools, techniques and frameworks used to analyse them.

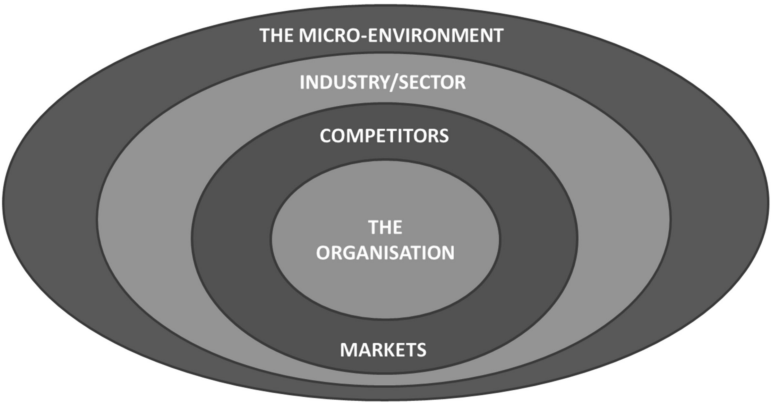

Fig. 2.3 Levels of the business environment

2.5.1.2 Analysing the Macro-environment – The Environmental Audit

No organisation exists in a vacuum, and most are extremely susceptible to influences emanating from external forces, defined by the diversity, the complexity and the speed of change of the environment. Furthermore, how these forces are interpreted is also important. Perceptually, organisations and their employees assist in the "creation" of their own business environment (see Chap. 6) To this end, organisations in the same industry often perceive their environment quite differently from each other, even though the environmental forces may, in fact, be very similar. Indeed, while we will not examine organisational culture in this chapter, it should be noted that companies sometimes use issues in the environment to shape organisational culture. For example, in the early 2000s, Marks & Spencer used the threat of acquisition by Philip Green's Arcadia Group, to create a 'siege mentality' among its staff.

The environmental audit, often called a PEST, PESTEL or PESTLE analysis (for the acronym Political, Economic, Socio-cultural, Technological, Environmental and Legal factors), is used to identify external influences that may impact the organisation (Fig. 2.4).

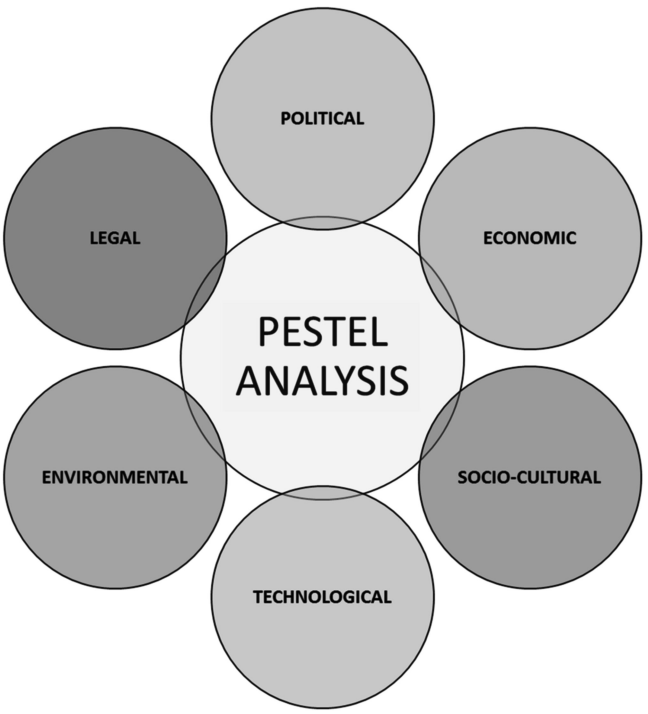

Fig. 2.4 PESTEL analysis

Indicatively, a PESTEL analysis might focus on issues such as:

- Political: Government stability, trade regulations, social welfare policies, attitude to taxation
- Economical: GNP, interest rates, exchange rates, inflation, unemployment, business cycles
- Socio-cultural: Demographics, social mobility, levels of education, disposable income
- Technological: Internet access, mobile phone usage, Government spending on R&D
- Environmental: Environmental legislation, percentage recycling, energy consumption
- Legal: Competition law, employment law, health and safety, intellectual property rights

In some cases, such as environmental legislation or unemployment level, issues span more than one category. Remember, PESTEL is a tool to generate ideas, not a constraint in which everything must be pigeon-holed. So, while widely-used, PESTEL does have its critics who point out that there are problems with:

– ***Over-simplification***: It's common for managers and analysts to present a simple list of the environmental factors that can affect the organisation. Unless the underlying factors are critically evaluated in terms of the degree of impact, the findings of the analysis are of little value
– ***Signal-to-noise ratio***: External forces are dynamic and sometimes change quickly making it difficult to predict why and how these factors may affect the present or future of the firm. For example, at noon on 20th April 2010 British Petroleum (BP) officials gathered on the platform of the Deepwater Horizon drilling rig to celebrate 7 years with without an injury on the rig. Almost 10 h later the rig exploded killing eleven staff and injuring another eighteen. In less than 7 days leaking oil had formed a slick 100-mile across, 20-miles from the coast of the United States. By June 2010 BP share price had collapsed by 53 %.
– ***Invalid assumptions***: Sometimes the factors mentioned in the analysis are based more on assumptions and less on actual facts. An analysis based on unfounded assumptions can lead to planning disasters. So, it's important to device some method to cross-verify whether the factors mentioned in the PEST analysis are not merely based on tenuous assumptions
– ***Data collection and 'freshness'***: Collecting enormous amounts of relevant data from the right sources has, until big data, been problematic – especially since most of the revealing data must be collected from external sources. Similarly, maintaining data 'freshness' and keeping the analysis updated has been difficult. Traditionally this has made PEST analysis time consuming, backward looking and costly.
– ***Data analysis and presentation***: A good PEST analysis requires volumes of information to be quickly collected, analysed and presented. Historically, when handling too much information users tended to get confused and lose sight of what factors are more critical (see Chap. 6). This ambiguity in prioritizing factors often jeopardised the whole analysis.

However, many of these shortcomings are being addressed by big data. Analytic techniques, utilising big data, are increasingly being used to identify trends. For example, research by Global Pulse (http://www.unglobalpulse.org/) and other groups, has found that analysing Twitter messages can signal spikes in unemployment, price rises and disease. Robert Kirkpatrick, Global Pulse Director, suggests that such "digital smoke signals of distress," usually come months before official statistics. This is particularly important since many developing countries have no access to reliable data. Big data is also facilitating a shift away from assumption-based analysis to data-based analysis. In Chap. 6 we examined how individual and group assumptions can be flawed. By changing the mind-sets of analytic-savvy executives (see Chap. 4), big data demands a more data-centric approach that ensures people question their assumptions and makes evidence a pre-requisite. Ultimately, big data will resolve the issues of data collection, analysis and presentation, transforming the PEST analysis from a technique to initiate discussion to an information-rich intelligence system. But the combination of big data and analytics can do much more in terms of assessing the business environment…

In business environments of high uncertainty, either due to complexity, rapid change or both, it may be impossible to develop a single view of how the environment may impact the company. Scenario Planning allows a company to develop a range of plausible perspectives of how the future might unfold. That is not to say that firms will be able to discern or predict the exact nature of a threat or an opportunity, but they will be better positioned to navigate the eventual outcome if they have considered uncertainty from multiple perspectives. Using big data and big data analytics in the scenario planning process allows for faster, more up-to-date, more accurate visions of the future. In a 2013 survey, the Economist Intelligence Unit asked Chief Financial Officers (CFOs), what strategic aspect of their role had increased data made the biggest positive difference – 40.3 % said scenario planning (http://www.wipro.com/documents/the-data-directive.pdf). Asked where the greatest potential for Big Data laid, 31.8 % of Chief Strategy Officers (CSOs) and 22 % of Chief Information Officers (CIOs) said scenario planning.

How else might Big Data improve scenario planning? Big Data can provide faster, more accurate data, but Big Data can also help quantify the risks associated with a particular scenario. When choosing a strategy from a series of scenarios decision-makers need to understand the probability and consequences of failure; they need to understand risk. Even before Big Data there was a move towards incorporating formal risk assessments into projects, business plans and strategies. Traditionally, risk analysis has involved sensitivity analysis (sometimes called 'what-if' analysis); identifying and challenging the assumptions underlying a particular strategy. For example, what would be the implications (on, say, profitability) if the sales forecast was under-achieved by 5 %? Unfortunately, the term 'sensitivity analysis' like the term 'strategy' has come to mean many things to many people and to some that includes 'brainstorming' and subjective discussion. However, at its most fundamental, sensitivity analysis uses mathematical models to determine how the uncertainty associated with a strategy can be apportioned. Big Data analytics enables the use of Monte Carlo simulations within traditional sensitivity analysis. Monte Carlo Sensitivity Analysis is a simulation tool for exploring the sensitivity of

a complex system, such as a strategy, by varying parameters within statistical constraints. These models are simulated in a loop, with probabilistic uncertainty between simulations. The results from the simulation are analysed to determine the characteristics of the system. For example:

A multi-national manufacturer wishes to calculate the risk associated with Asian production plants due to a widespread bird flu pandemic which is currently affecting many workers in the plants. The *primary risk* is the pandemic itself. This leads to the following *influenced risks*:

- High sickness rate and lower productivity in the plants where the pandemic has hit.
- Lower sales of products due to low production rates.

Each influenced risk may have associated with it a series of other influenced risks. Thus, the high sickness rate noted above, results in the following further influenced risks:

- Shipments are not delivered on time.
- This may lead to the further risk of fraud, since if most colleagues are out of the office because of sickness, segregation of duties may be violated.
- This again may lead to a higher impact of the risk if it happens.

By structuring risks in a risk hierarchy and running a Monte Carlo simulation on it, managers can determine more precisely what the final risk will be, in terms of both probability and impact. It is important to note that scenario-planning at this level is highly mathematical and requires the skills of a Data Scientist. We will consider the role of the Data Scientist in Chap. 5.

2.5.1.3 Industry Sector Analysis – The Micro-environment

All businesses operate within a micro-environment determined by the industry structure. Economic models of "perfect competition" and "pure monopoly" tend to be based on somewhat unrealistic assumptions and should be regarded as ideal types of market structure, which establish the boundaries within which genuine markets exist and operate. In practice, oligopoly and monopolistic competition are much nearer to the market structures found in the real world. Since the objective of this chapter is strategy we will not concern ourselves with the detail of economic theories, though you should recognise that models and frameworks that address industry structure are closely aligned with economic theory. Analysing the micro-environment gives rise to a huge range of issues. This analysis can be more easily defined by identifying the key factors influencing the industry and using these to focus the analysis on particularly important matters. Perhaps the best-known framework for this is Michael Porter's five-force framework (Fig. 2.5).

Before we examine the 5-forces we need to briefly visit two core concepts that often get lost in the interpretation of Porter's work, namely, what is meant by the terms; competition and value. Merriam-Webster defines competition in business as "*the effort of two or more parties acting independently to secure the business of a third party by offering the most favourable terms*". However, things are not so simple. Let us assume

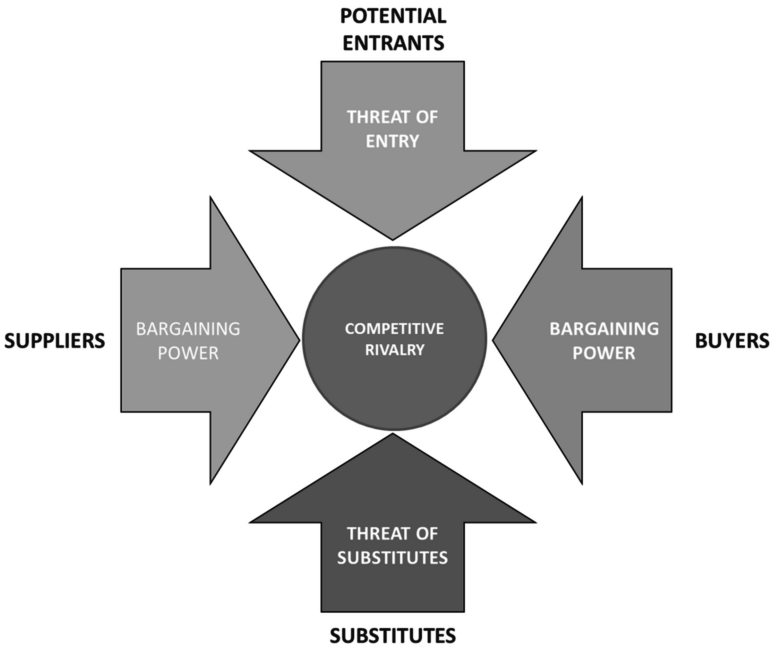

Fig. 2.5 Porter's 5-force framework

that we have two rubber glove suppliers serving a single large customer, say, the British National Health Service (NHS). Both companies offer a product that does a similar job. The product of Company A is slightly cheaper than that of Company B, but Company B's product lasts a little longer. To 'compete', Company A invests in product development to increase the longevity of its gloves. Meanwhile, Company B invests in new machinery to make its product more cost effectively. The resulting 'arms race' drives down the selling price and drives up the durability of both products. Both companies have invested significantly without realising any increase in value – because all of the additional value has been captured by end-user. Consequently, Porter tells us that competition is not about winning a sale, it's not about beating a rival; competition is about capturing value. That means earning profits. Viewed from this perspective Company A and Company B may both be in competition with each other, but they are also in competition with the end-user, in this case the NHS.

Almost without exception, industry structure determines who captures the value (profit!) in any industry sector, and the industry structure is determined by five forces:

- ***The bargaining power of suppliers***: Powerful suppliers like, say, the electricity generating companies in the UK, will use that power to impose higher prices or more favourable terms. In either case the profitability of a company (or individual) will be reduced as the supplier captures more of the value for themselves.
- ***The bargaining power of buyers***: Powerful customers will use that power to force down prices. They may also demand that more features/benefits be included which, in turn, drive up the cost. In either case the profitability will be reduced as the

customer captures more of the value for themselves. Large multi-national companies such as Monsanto, Tesco and Wal-Mart are renowned for using their buying power to limit the profitability of their suppliers. Monsanto, who have patented seeds for some vegetable and fruit species, monitor seeds sold, used and any seeds arising from the crop itself. All seeds must be returned to Monsanto, who have successfully prosecuted farmers who have tried to grow "unpaid for" seeds.

- ***The threat of new entrants***: Entry barriers protect an industry from newcomers that add further capacity to the industry and seek market share (thereby driving down profits). Microsoft, with its operating system, Windows, has created significant barriers to entry due to scale, control of distribution channels and high switching costs. Conversely, the "bed and breakfast (B&B)" accommodation sector has relatively few entry barriers (it is available to anyone with a spare room) and, consequently, profitability is low.
- ***The threat of substitute products/services***: Substitute products (or services) meet the same basic need as the industry's product in a different way. For example, in many countries mobile-phones have taken significant market share from both camera manufacturers and watch manufacturers. Substitute products limit the profitability of an industry
- ***The rivalry among existing competitors***: As we saw with Company A and Company B above, if rivalry is intense, companies tend to compete away the value they create. They do this by either passing it on the buyers (as discounts or extra features) or by spending it on the costs of competition (higher advertising spend, higher development costs etc.)

Unfortunately, like the PEST analysis earlier, many 5-force analyses are often subjective, heavily bias and devoid of tangible, independent data. Big Data offers the potential to investigate the 5-forces more thoroughly, and at a finer granularity than ever before. What does that does that mean in practice? (Table 2.2).

2.5.2 Strategic Capability – The Value Chain

2.5.2.1 Introduction

The subject of strategy is awash with vocabulary – nowhere more so than describing the internal strengths and weaknesses of a company. Some terms are well-defined while others, like the word 'strategy' itself are used to describe different things at different times by different authors. Consequently we have;

- Threshold strategic capabilities
- Dynamic capabilities
- Threshold and unique resources
- Tangible and intangible resources
- Threshold and core competencies
- Key success factors
- Critical success factors

Table 2.2 Porters 5-forces and the three 'V's

	Volume	Variety	Velocity	Example
Supplier power	What transactional data is currently collected in your interactions with suppliers? How do you use this data?	What is the potential of integrating third-party unstructured data sources into your supply chain?	What are the implications of faster data flows between you and your supplier?	Supplier capacity risk management: identify/eliminate bottlenecks
	How might more detailed and granular data assist in the prioritisation and evaluation of suppliers?	How might more third party/ unstructured data be used to reduce switching costs?	What are the implications of real-time visibility of product transportation and just-in-time (JIT) delivery?	Demand–supply matching: use intersections of supply/demand curves to optimise stock-turn
	How might more detailed and granular data be used to reduce switching costs?	What would be the impact of, say, adding sensor-generated performance data into your supply chain?	How might faster, real-time data be used to reduce switching costs?	Modelling/scheduling: Simulation and contingency planning within your supply chain
	How might greater transparency affect the power balance within your supply chain?		How might JIT and the use of third party data affect the power balance within your supply chain?	
Competitive rivalry	What data do you have on your competitors? How do you use it? How might you use it better?	What is the potential for using third party unstructured data to enhance your competitive advantage? How might you differentiate yourselves using this data?	What alternative business models are enabled by faster, more accurate data? Are these models an opportunity or a threat?	Cross-media Conversion Attribution Analysis: To examine cross-channel pricing and effectiveness
	What data do they have on you? How do they use it? How might they use it against you in the future?	How might competitors use third party unstructured data against you? How might they differentiate themselves using this data?	How might you (or your competitors) use fast data to improve time-to-market, product performance, after-sales service or reduce costs?	A/B Testing: To identify merchandising messaging and placement
				Analyse social media and mobile data: To identify competitive moves or changes in user trends

(continued)

Table 2.2 (continued)

	Volume	Variety	Velocity	Example
Buyer power	What transactional data is currently collected in your interactions with customers? How do you use this data?	What are your customers saying about you on social media?	What are the implications of faster data flows between you and your customers?	Sentiment analysis: Used to micro-segment your market and identify trends in products, services, pricing and promotion
	How might more detailed and granular data assist in the prioritisation and evaluation of customers?	How might more third party/unstructured data be used to increase switching costs?	How might faster, real-time data be used to increase switching costs?	Real-time targeting of customers: Used to increase on-site revenue-per-customer
	Who are your most profitable customers? Who are the most influential?	What would be the impact of adding sensor-generated performance data into your Customer Relationship Management (CRM) system?	What are the implications of product sensor data analysis for future sales and after-sales service?	Recommendations engines: Used to increase shopping cart revenue-per-customer
	How might more detailed and granular data be used to increase switching costs?		How might fast data, transparency and the use of third party data affect the power balance between you and your customer base?	Product sensor data analysis: Used to understand how, when and where the product was used
	How might greater transparency affect the power balance between you and you're your customers?			
Potential entrants	How might more detailed and granular data be used to construct entry barriers?	How might social media and mobile data be used to identify/quantify new product, market, customer and competitor developments?	How might faster, real-time data be used to identify/quantify new product, market, customer and competitor developments?	Collection of customer data via the "ClubCard" system allows Tesco to adjust pricing offers to suit client preferences. This provides a strong barrier to entry for other retailers

	How might this data be used to identify new entrants earlier?	How might potential entrants use third party unstructured data against you? How might they differentiate themselves using this data?	How might fast, real-time data be used to construct barriers to entry?	Big data may be used to identify hitherto unknown switching costs or economies of scale
		How might social media and mobile data be used to construct barriers to entry?		The costs and skills required to achieve the benefits of big data may itself be a barrier to entry for smaller companies
Substitutes	How might more detailed and granular data be used to identify potential substitute products/ services?	How might social media and mobile data be used to identify/ quantify the threat of potential substitute products or services?	How might faster, real-time data be used to identify/quantify the threat of potential substitute products or services?	
		How might potential substitutes use third party unstructured data against you? How might they differentiate themselves using this data?		

To avoid confusion we will focus on the use of one framework which encompasses all of these concepts, but adds the benefit of quantification to an often highly subjective discussion, namely, the Value Chain.

2.5.2.2 The Value Chain

Before we go any further it is important to differentiate the Value Chain from the "Analytics Value Chain" that is currently *de rigueur* in consulting circles. While the Analytics Value Chain represents a reinvention of the Data, Information, Knowledge and Wisdom (DIKW) hierarchy discussed in Chap. 6, the original Value Chain (Fig. 2.6), initially proposed by Michael Porter in 1985, is based upon understanding an organisation as a system, made up of activities each with inputs, transformation processes and outputs. These, in turn, involve the acquisition and consumption of resources – money, labour, materials, equipment, buildings, land, administration and management. Thus, how these activities are carried out determines costs and affects profits. What Porter calls 'activities', others variously call 'capabilities' or 'competences'. However, before we immerse ourselves in the Value Chain, lets us first examine another, often misused, term; competitive advantage. Google the term "competitive advantage" and you will get 53 million hits. The top two hits describe competitive advantage as:

- *…when an organization acquires or develops an attribute or combination of attributes that allows it to outperform its competitors* (Wikipedia); and
- *…an advantage that a firm has over its competitors, allowing it to generate greater sales or margins and/or retain more customers than its competition* (Investopedia)

Unfortunately, both are rather vague when, actually, the term is both concrete and specific. A company has a 'competitive advantage' when it can command a premium price or operate at lower costs relative to its rivals. Thus, competitive advantage is about creating and maintaining superior value which, as discussed earlier, equates directly to profitability, that is;

Value Created and Captured – Cost of Creating that Value = Profit Margin

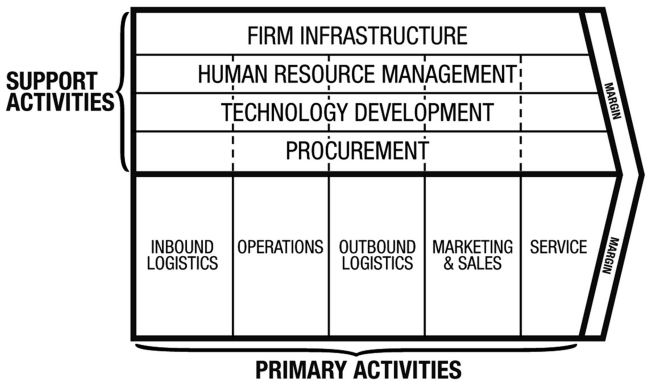

Fig. 2.6 The value chain

Competitive advantage arises from the myriad of activities (and relationships between activities) that companies perform as they operate and compete. The activities themselves are discrete economic functions or processes, such as managing a supply chain or sales force, developing new products or the delivery of after-sales service. Activities are often multi-faceted, requiring a team of people with different skills, unique technologies, fixed assets and, of course, information. How activities, both individually and as value chains, use, create and distribute information is increasing being seen as an important driver of competitive advantage.

- ***Primary Activities***: Primary activities are associated with the physical creation, sale, maintenance and support of a product or service. They are:
  - *Inbound logistics* – The activities associated with the receiving, storing, and distributing inputs internally. Relationships with suppliers and integration into the supplier's value chain are an important factor in creating value here.
  - *Operations* – These are the transformation activities that convert inputs into outputs that are then sold to customers. Here, it is the operational systems that create value.
  - *Outbound logistics* – The activities associated with the delivery of the product or service to the customer, for example: collection, storage, and distribution systems. These may be internal or external to the organization.
  - *Marketing and sales* – The activities uses to persuade buyers to purchase from you rather than your competitors. The benefits offered, and how well those benefits are communicated, are sources of value here.
  - Service – The activities associated with maintaining the value of the product or service to the buyer, once it's been purchased.
- ***Support Activities***: These activities support the primary activities. The dotted lines in Fig. 2.6 indicate how each support activity may assist each primary activity. For example, procurement may support operations by, say, negotiating lower prices for manufacturing machinery, while supporting marketing and sales by agreeing better terms on company car leasing .
  - *Infrastructure* – These are the functions that allow a firm to maintain daily operations e.g. accounts, legal, administrative, and general management are examples of necessary infrastructure that businesses may use to their advantage.
  - *Human resource management* – This refers to how a company recruits, trains, motivates, rewards, and retains its employees. People are a significant source of value and businesses can create a clear advantage with good HR practices. We will examine this in more details in the Chap. 5
  - *Technological development* – This refers to managing and processing information, as well as protecting a company's knowledge base. Minimizing technology costs, preserving technological advances, and sustaining technical excellence are important foundations of value creation.
  - *Procurement* – These are the functions that allow the firm to get the resources it needs to operate. This includes finding supplier and negotiating best terms and prices.

In many industries one company's value chain forms one part of an overall *value system* which creates value from the extraction of raw materials to the delivery of a finished product to and end-user. In this instance, how that specific company value chain relates to its suppliers and buyers, those downstream or upstream in the value system, can be a major source of competitive advantage. Consider a company producing canned foods for sale in retail supermarkets. *Upstream,* the company must choose whether to make the cans itself or to buy them in. If it chooses to make them, does it buy the raw materials from a supplier or produce them itself? *Downstream*, does the company distribute its own products or does it use a third party logistics company? If it distributes for itself, does the company own the trucks or does it lease them from a supplier? It is important to remember that the profitability of every company within the value system will be determined by how much value that particular company is able to retain. Within a value system Porters 5-forces analysis can help understand who is profitable, and why.

Much of the work on business processes, business process management (BPM), business process re-engineering (BPR), owes a major debt to the value chain. Consequently, many companies, particularly those with established Enterprise Resource Planning (ERP) systems, are overflowing with internal, transactional data. Data-intensive techniques such as Total Quality Management (TQM) and Six-Sigma methodologies collect copious amounts of information and have transformed product quality and reliability in many manufacturing industries, but often the data remains isolated and compartmentalised. If the value chain analysis (and its extension to the wider value system) gives us a framework to determine and define a firm's competitive advantage, then Big Data gives us the tools to enable more detailed analysis and decisions using the transactional date at our disposal (Table 2.3).

2.5.3 The SWOT 'Analysis'

Having determined our strategic position we now have a clear understanding of our business environment and our place in that environment. Through value chain analysis we understand what we are good at (the things that add value) and the areas that we need to improve. In short we have all we need to prepare a SWOT analysis. Another acronym, SWOT stands for;

- Strengths
- Weaknesses
- Opportunities; and
- Threats

It has been argued that the acronym should be written as; TOWS, since analysis of the external environment is usually done first but, in practice, it is the insight that is important, so we will leave that particular debate to the academics.

Despite its name, the SWOT analysis isn't really an analysis. It is a synthesis of all the preceding analyses. The outcome of both the PEST analysis and Porters

Table 2.3 Big data in the value chain

Firm infrastructure		
Performance management		
Predictive real-time dashboards and scorecards (enables companies to see emerging trends and act sooner)		
Cost management		
Activity-based costing (ABC)		
Mergers & acquisitions		
Due diligence to include:		
Cash flow analysis		
Supply chain efficiencies		
Predicted customer reaction		
Impact on costs		
Governance		
Identify insider trading		
Questions:		
Which activities have greatest impact on performance?		
Are we executing against strategy?		
Human resource management		
Innovative talent acquisition	Innovative talent utilisation	Innovative talent retention
How do prospective employees find us?	How are we going to get them their first salary cheque?	How do we identify/ intervene if employees are unhappy and/or under-performing?
How do we hire the best employees?	What are the drivers of strong motivation and performance?	How can we engagement our staff more completely?
How do we get them productive as soon as possible?		

(continued)

Table 2.3 (continued)

Technology development				
Sensor-based logistics e.g.	What are the preferences and behaviours of our consumers and market segments?	Sensor-based logistics e.g.	In-memory analytics alerting management regarding merchandising performance changes	Loyalty programmes e.g.
FedEx 'Senseaware'	Innovation and Quality Control through crowdsourcing e.g.	FedEx 'Senseaware'	Sentiment analysis e.g.	Pepsi 'Loot'
	Idea generation e.g.		Gatorade Command	MyCoke Rewards
	Dell Ideastorm		Centre	Samsonite Travel
	My Starbucks Idea		Dell Listening Centre	Miles
	Co-creation e.g.		Platform-centred campaigns e.g.	Crowdsourced
	4food		Nike Human Race	Feedback
	Threadless.com		Dewmocracy	
	Lego Mindstorms		Social commerce e.g.	
	Concurrent engineering & Product Lifecycle Management (PLM)		Levi's store	
	Digitally-enabled products & services		Disney F-store	
	Nike++		Twitter support e.g.	
	ecoDrive		Best buy Twelp Force	
	Kraft iFood		Delta Assist	
			Crowdsourced research	

Procurement				
Credit scoring			Demand forecasting	
Fraud detection			Use merchandising insights from granular POS data to negotiate superior supplier terms and conditions	
Supplier pricing				
Inbound logistics	*Operations*	*Outbound logistics*	*Marketing & sales*	*Service*
Shelf management systems	Total quality management (TQM)	Optimise scheduling/routine	Bayesian inference techniques to improve monthly & quarterly revenue forecasts	Warranty analysis
Inventory replenishment	Six sigma	Yield management	Conversion Attribution Analysis to optimise ad placement and messaging	Determine drivers of warranty claims
Truck scheduling/ routing	Statistical process control (SPC)	Leverage social media and mobile data to uncover merchandising insights to optimise merchandising performance	How can we optimise our price, promotion and merchandising strategies?	Provide personalised content
Optimise supply chain management (SCM)	Process variations	Engagement of distributors	How can we determine most profitable channel partners	Customer loyalty programme
Predict supplier stock levels	Product customisation	JIT distribution	What are the drivers of distribution channel profitability?	Customer retention
Determine drivers of supplier quality and performance	Defect rates		How can we optimise our store locations?	Predict customer defection
Use real-time POS data to identify and notify suppliers of potential out-of-stock situations more quickly	ERP systems		How can we understand consumer price sensitivity?	Optimise use of support channels

(continued)

Table 2.3 (continued)

Engagement of suppliers	Use real-time POS and RFID data to manage markdowns, identify slow and no movers and optimise in-store inventory		What is the best way to target offers and messages to consumers and segments?	% customer testimonials
Transparent sourcing	Sensor data-driven operations analytics		How can we determine most profitable customers?	% goods returned
	"digital factory" for lean manufacturing		How can we determine advertising and promotional effectiveness	CRM
				Combine social media with POS data to identify potential product or service performance problems
				Product sensor data analysis for after-sales service
				Customers experience enhancement
				after-sale experience enhancement

Table 2.4 SWOT analysis of Apple

Strengths	**Weaknesses**
A combination of horizontal and vertical integration created formidable competitive advantage	Lack of products at different price points limits the market scope
Successful product lines driving the growth	High dependence on iPhone and iPad product lines
Robust growth rates	
Opportunities	**Threats**
Growth opportunity in the enterprise market	Intense price competition in the emerging nations
Emerging nations provide strong growth opportunities	Operating in complex and challenging environment could impact market position
Apple TV to benefit from the growing smart TV market	

5-force analysis should reveal the most pertinent opportunities available to the company and identify the most relevant threats. Likewise, value chain analysis (coupled with other techniques such as marketing audits, product development road maps etc.) should reveal core competences (strengths) and identify possible weaknesses. A SWOT analysis for Apple ™ might look something like this (though in practice these issues would require more quantification to be meaningful).

The SWOT is our starting point for strategy development. For example, from Table 2.4 we can deduce the following about Apple's strategy:

- Emerging markets provide strong growth but low margins: How can Apple either reduce costs to maintain margins or differentiate the products (add value) to maintain margins?
- Current product lines are highly successful and widely adopted but the product range is limited: Should Apple increase their product portfolio or seek more markets (such as the enterprise market) for their existing products?

How might Apple approach questions such as these? Should they focus on cost-effectiveness or product development? Should they seek more markets or more products? These questions require hard choices…

2.6 Strategic Choice

2.6.1 Introduction

Choice is at the centre of strategy formulation, for if there are no choices to be made, there can be little value in thinking about strategy at all. However, even when managers are apparently free to make strategic choices, results may eventually depend as much on chance and opportunity as on the deliberate choices of those

managers (see Chap. 6). In an ideal world, any process of choice could be rationally divided into four steps – identify options, evaluate those options against preference criteria, select the best option, and then take action. This suggests that identifying and choosing options can be done purely analytically. In practice, it may be difficult to identify all possible options with equal clarity or at the same time. Unexpected events can create new opportunities, destroy foreseen opportunities, or alter the balance of advantage between opportunities. Identifying and evaluating options is a useful approach but it has limitations – the future may evolve differently from any of the options…

2.6.2 Type, Direction and Criteria of Strategic Development

In Fig. 2.6 we offered a possible SWOT analysis for Apple. From that SWOT we raised a number of questions, namely;

- What kind of strategy do we need? and
- What direction should the company take?

However, these questions are not specific to Apple; these questions are applicable to all companies developing a strategy. In discussing the 'type' of strategy we return, initially, to Michael Porter, and then to later work on 'the value disciplines'.

In his 1980 book, "Competitive Strategy", Michael Porter first postulated his 5-forces framework. In the same book he also suggested that firms had to choose between one of three generic strategies:

- Cost leadership: in which a company competes by offering low *relative* price (that is, to maintain profit margin low prices are match with low operating costs). Example: BMW cars
- Differentiation: in which a company offers a different product or service to a customer base that is prepared to pay a premium for unique design, styling, quality, reliability or other variable. Example: Ferrari sports cars
- Focus: in which a company segments its market into one or more specific niches. Within this niche the company may choose a cost leadership or differentiation strategy but the prime focus remains the needs of the niche. Example: Morgan cars

Choosing one of the generic strategies requires a thorough understanding of the organisations position and its long-term objectives – but Porter argues that it is a choice that must be made. Each of the generic strategies has implications for how the company structures its value chain and the metrics used to measure the success of the strategy. Trying to be 'all things to all customers' some firms are outflanked by cost leaders on one side and differentiators on the other, the common strategic mistake of being caught 'stuck in the middle' (Fig. 2.7).

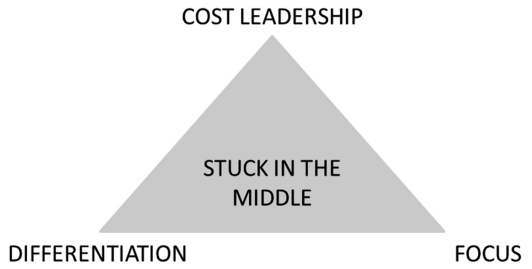

Fig. 2.7 Porter's generic strategies (Porter 1980)

Critics have argued that hybrid strategies, combining two of the generic strategies, can be successful and that companies often need the flexibility to move between strategies. In 1993 Treacy and Wiersema introduced a revised framework, the Value Disciplines, namely;

- ***Operational excellence***: The focus of this strategy is on efficiency, cost-effectiveness, supply chain management, quality by systems and volume production. The strategies of most multi-national corporations are an interpretation of this discipline
- ***Product leadership***: The focus of this strategy is strong innovation, R&D and brand marketing. Key metrics are based upon time-to-market and high margins in a short time frame.
- ***Customer intimacy***: The focus of this strategy is in tailoring products and services to individual or niche customers. These require good CRM systems, on-delivery of products/services, lifetime value concepts, reliability and maintain close personal contact with the customer.

In contrast to Porter, Treacy and Wiersema suggest that while a company must focus on one of the disciplines, it must also aim benchmark itself with its competitors on at least one of the other disciplines. But what are the implications of generic strategies for big data?

Perhaps, most importantly, a firm's choice of generic strategy sets the parameters (particularly funding) for big data initiatives. For an operationally excellent strategy the big data focus will most likely be on optimising internal and supply chain processes, for example, the use of real-time POS, RFID data and sensor-driven operations analytics. A company pursuing a product leadership strategy will, no doubt, focus on big data applications such as product lifecycle management, innovation and idea generation through, say, crowdsourcing and advances in digitally-enabled products/services. Finally, a customer intimate organisation will seek to deploy techniques such as conversion attribution analysis to optimise advertising, Bayesian inference techniques for forecasting, sentiment analysis and crowd-sourced market research. Thus, given the scope of big data techniques, it is imperative that managers and executives clearly understand the firm's generic strategy before they commit to the objectives of a big data initiative.

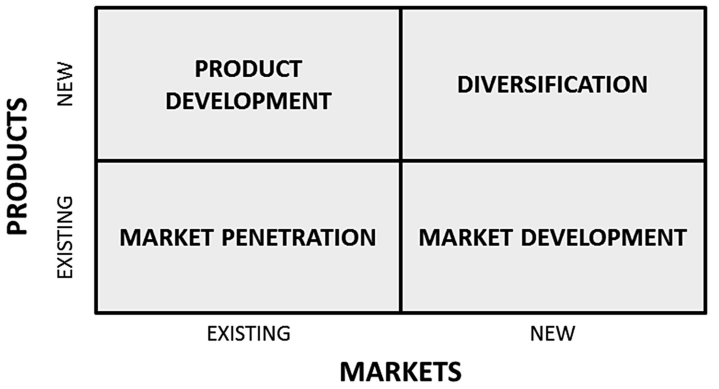

Fig. 2.8 Strategic direction – the Ansoff Matrix (Ansoff 1988)

Given a core business with a distinguishing competitive posture, in terms of differentiation and scope, we now come to the question, "What strategic directions are available to develop that core business?" Furthermore, what impact might the level of risk have on the viability of the strategy? An organisation can develop a business in a number of ways. It can develop its product offerings within that market, it can develop its markets via new segments, new channels, or new geographical areas, or it can simply push the same products more vigorously though the same markets (Fig. 2.8).

This simple framework asks a number of questions, the answers to which help determine strategic direction and accompanying risk. A market penetration strategy focuses on delivering more value to existing customers in existing markets. This is suitable if the market is relatively new, is expanding or if your company is a new entrant to the market. This is considered a low risk strategy. However, assuming the market for your product is getting saturated, the two medium risk alternatives are to design new products for your existing customers or seek new customers for your current products. These two strategies are considered medium risk because:

- *Product development*: The company must be sufficiently innovative to design products acceptable to the existing customer base. This requires investment in staff, time and technology. Risks include; failure to develop new product, poor adoption by customer base, new product cannibalises sales of old product, or lack of adoption of new products damages the brand of the existing product.
- *Market development*: To be successful in new markets the company must understand the market dynamics. Selling a product to the government organisation requires different skills to selling to a private company. A product that meets market requirements in the United Kingdom may be unsuitable for consumers in, say, Japan. Risks include: Wrong market entry strategy, aggressive response by new competitors, product unsuitable for consumers, new competitors respond by attacking your existing market.

The fourth, and most high risk strategy, is that of diversification. Developing new products for unfamiliar markets requires significant resources and is usually considered a last resort.

2.6.3 Aligning Business and IT/IS Strategy

So far we have examined strategic analysis in some detail. We have also touched upon issues associated with strategic direction. Finally, we will investigate one important aspect of strategy implementation, particularly for big data, that of aligning IT/IS strategy with business strategy. A number of commentators have made the point that big data is not about technology. However, it is important to recognise that, without technology as an enabler, big data would be difficult, if not impossible, to achieve. Only companies with a robust technical environment can expect to reap the benefits of big data. Unfortunately, large investments in technology often commit companies to long-term infrastructures that may constrict their strategic flexibility. So, what is the relationship between business and IT/IS strategy and how might these two be aligned?

Alignment can be defined as the extent to which the IT department and business needs, objectives and/or structures are consistent with each other. Particularly, researchers have focused on how four aspects combine to deliver the full potential of information technology, namely; business strategy, IT/IS strategy, business infrastructure and processes and IT/IS infrastructure and processes (Fig. 2.9):

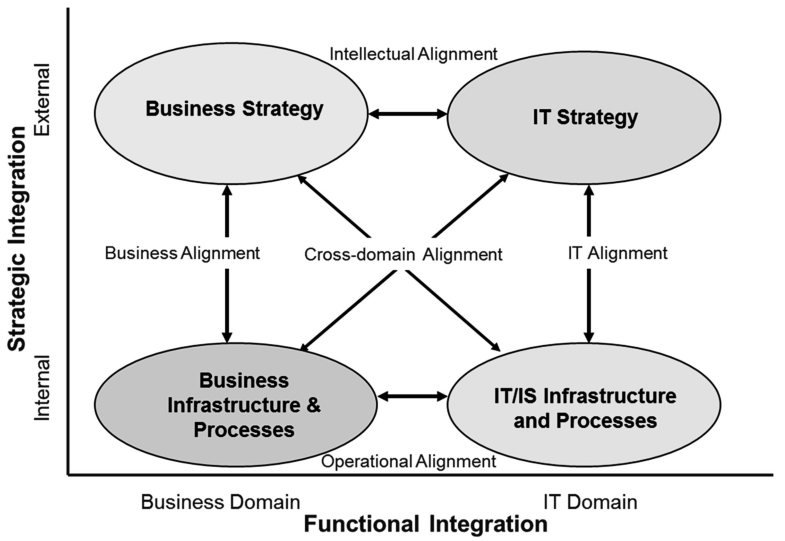

Fig. 2.9 Figure 11: The strategic alignment model (Henderson and Venkatraman 1993)

Alignment at a strategic level (intellectual alignment) and at an operation level (operational alignment) may be considered challenging, but is achieved due to relevant stakeholders holding comparative positions and perspectives within the company. Likewise, domain alignment is possible due to existing hierarchical relationships within the same domain. Where alignment becomes problematic is at hierarchical and domain boundaries. Researchers propose four combinations of these alignment types:

- ***Strategy execution***: Business strategy impacts the IT infrastructure but is constrained by the business infrastructure
- ***Technology transformation***: IT infrastructure is affected by the business strategy but is constrained by the IT strategy
- ***Competitive potential***: Business infrastructure is affected by the IT strategy but is constrained by the business strategy
- ***Service level***: IT strategy impacts the business infrastructure but is constrained by the IT infrastructure

Companies pursuing technology transformation and competitive potential focus chiefly on aligning their IT and business strategies (intellectual alignment) to differentiate their firm from competitors. That is, the utilisation of IT is directed towards sustaining the business strategy in the marketplace, with a primary focus on improving customer service and taking value from competitors. Thus, these firms are more likely to have higher levels of profitability and customer satisfaction.

Conversely, companies may focus on cost-effectiveness as a necessary condition to compete. However, since competitors can also purchase similar technologies, it is difficult to differentiate production processes and customer service from the competition. Firms practicing a strategy execution and service level focus on aligning their IT and business infrastructures & processes. Operational alignment focuses on maximising resource productivity. This minimises wasted resources by improving visibility and information flow between employees. Thus, firms pursuing operational alignment will be better positioned to create a competitive advantage through the development of greater operational efficiencies e.g. operational excellence.

Another framework used to manage enterprise IT software applications and software-based services is Applications Portfolio Management (APM). Based around the Growth-Share Matrix, developed by the Boston Consulting Group, APM enables organisations to:

- identify redundant or semi-redundant applications
- quantify the stability, quality, and maintainability of applications
- quantify the relative importance of each application to the business
- allocate resources to applications based upon business priorities

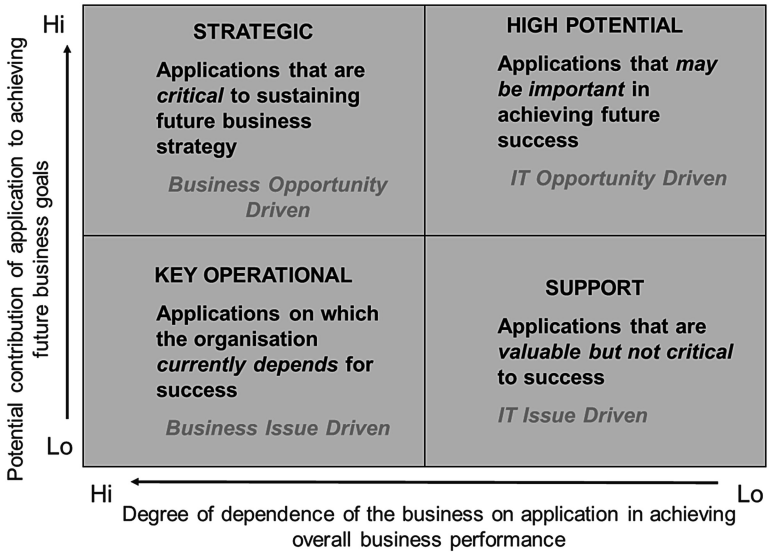

Fig. 2.10 Applications portfolio

APM also allows managers to understand how applications support their business functions. This helps defuse business/IT conflict.

Using their contribution to current and future objectives, the APM matrix (Fig. 2.10) allows applications to be categorised as strategic, key operational, high potential or support. Each application has a lifecycle and, over time, may move from one segment to another. How each application is resourced is determined by where it lies in the APM matrix.

One of the benefits of APM is that it compels both business and IT managers to define the term 'application', to understand where the boundaries between applications lie and to make explicit the business rationale for each application. To be included in the portfolio matrix an application must (Table 2.5):

- be simple for business team members to explain, understand, and apply
- make sense to development, operations, and project management in the IT groups
- have clearly defined boundaries

Figure 2.11 shows how a manufacturing company may view its applications. The matrix can be made more elaborate by, say, using the cost (either purchase price or annual maintenance costs) to signify the diameter of an application 'bubble'. This is a useful way to capture the cost/benefits of each application.

Table 2.5 Key issues in portfolio segments

	Business driver	Critical requirements
High potential	Business idea or technology opportunity	Rapid evaluation to avoid wasting resources on failures
	Individual initiative – owned by a 'product champion'	Clear understanding of potential benefits to business strategy
	Need to demonstrate the value of the idea	Identify best way forward
Strategic	Market requirements, competitive or other external forces	Fast development to meet objectives within window of opportunity
	Business objectives	Flexible system that can be adapted for future use
	Achieving/maintaining competitive advantage	
Key operational	Improving performance of existing activities	High quality, long-life solutions and effective data management
	Integration of data and systems to avoid duplication and inconsistency	Balancing costs with benefits and risks
	Avoid business disadvantage or allowing risk to become critical	
Support	Improved productivity and/or efficiency of specific business tasks	Low-cost, long-term solutions
	Comply with legislation	Compromise the processes to the software available
	Most cost-effective use of IS/IT funds	Objective cost/benefit analysis to reduce financial risk then manage costs carefully

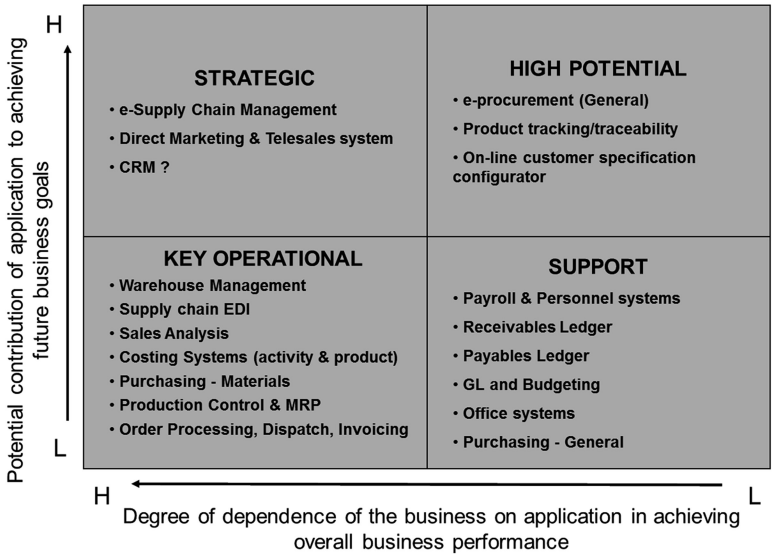

Fig. 2.11 Applications portfolio – an example from manufacturing

2.7 Summary

In this chapter we have examined how big data impacts organisational strategies and how those strategies are developed. We have investigated the strategy process before going on to examine some of the frameworks used to investigate the business environment and evaluate strategic alternatives. Finally, we have looked, briefly, at how business strategy and IT/IS strategy may be aligned.

2.8 Review Questions

The answers to these questions can be found in the text of this chapter.

- what does the acronym PESTEL mean, and what is it used for?
- describe Porter's 5-forces. What can they tell us about the business environment?
- what are the implications of big data on a firms value chain?
- describe the three 'value disciplines'
- what are the advantages and disadvantages of Application Portfolio Management

2.9 Group Work Research Activities

These activities require you to research beyond the contents of the book and can be tackled individually or as a discussion group.

2.9.1 Discussion Topic 1

In this chapter we have discussed scenario planning. In the 1970s Oil giant, Royal Dutch Shell, established a Scenario Planning Division which has become the envy of many multinationals (Cornelius et al. 2005, p. 53). Using a search engine, investigate the phrase, "Three decades of Scenario Planning in Shell". Alternatively, explore the Shell web-site: www.shell.com/global/future-energy/scenarios.html. How does Shell's approach to scenario planning compare to that of the PESTEL analysis discussed? What are the implications of big data for the way Shell prepares its scenarios?

2.9.2 Discussion Topic 2

Choose a company you are familiar with. What is its generic strategy (choose either one of Porters strategies or one of the Value Disciplines)? What sort of applications do you think the company will have in its applications portfolio? Try drawing an application portfolio matrix for the company you have chosen. Are the applications in the 'Strategic' quadrant consistent with the firms generic strategy?

References

Ansoff H (1988) Corporate strategy. Penguin, London
Cornelius P, van de Putte A, Romani M (2005) Three decades of scenario planning in shell. Calif Manage Rev 48(1):92–109
Hamel G (1997) Killer strategies that make shareholders rich. Fortune 135(12):70–84
Henderson J, Venkatraman N (1993) Strategic alignment: leveraging information technology for transforming organisations. IBM Syst J 32(1):4–16
Johnson G, Scholes K, Whittington R (2007) Exploring corporate strategy: text and cases, 8th edn. Financial Times/Prentice Hall, London
Magretta J (2012) Understanding Michael Porter: the essential guide to competition and strategy, 1st edn. Harvard Business Review Press, Boston
Mintzberg H (1994) The rise and fall of strategic planning: reconceiving roles for planning, plans, planners, vol 458. Free Press, New York
Parise S, Iyer B, Vesset D (2012) Four strategies to capture and create value from big data. Ivey Bus J 76(4):1–5
Porter M (1980) Competitive strategy, 1st edn. Free Press, New York
Porter M (1985) Competitive advantage, 1st edn. Free Press, New York
Treacy M, Wiersema F (1993) Customer intimacy and other value disciplines. Harv Bus Rev 71(1):84–93

http://www.springer.com/978-3-319-13502-1

Information Systems Management in the Big Data Era

Lake, P.; Drake, R.

2014, XVII, 293 p. 73 illus., Hardcover
ISBN: 978-3-319-13502-1