Course: **Introduction to Engineering**

Unit: **Innovation and Entrepreneurship**

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1. INTRODUCTION

1.1 IMPORTANCE OF INNOVATION AND ENTREPRENEURSHIP FOR ENGINEERS

- Two main career options for engineers are to become employees of innovative organisations, or to become self-employed in their own businesses.
- Either way, it is important for these engineers to remain innovative, and to show entrepreneurial thinking.

1.2 SCOPE OF THIS LECTURE

This lecture provides students with a high-level overview of the following major issues concerning innovation and entrepreneurship:

- Innovation and entrepreneurship, discussing intrapreneurship, entrepreneurship, innovation in organisations, common fallacies about entrepreneurship, checklists to determine innovativeness and entrepreneurial abilities, and selected examples of entrepreneurship.
- Decision-making about business opportunities, describing market research; strengths, weaknesses, opportunities and threats (SWOT) analysis; and trade-off studies as tools for rational decision-making about new business opportunities.
- **Strategies for new business opportunities**, discussing different competitive strategies, strategies for business growth, and competitive position versus business growth.

2. INNOVATION AND ENTREPRENEURSHIP

2.1 INTRODUCTION

- The French economist J.B. Say defined an *entrepreneur* around 1800 as *"someone who shifts economic resources from an area of lower to an area of higher productivity and yield"* (DRUCKER 1985b).
- Today many people consider an entrepreneur as someone who:
  - takes a business risk, or
  - starts a new (mostly small) business, or
  - owns a business, or
  - makes money in a clever way.
- Some people wrongfully think that cheating others out of their money is a sign of entrepreneurship.
- However, entrepreneurship is something totally different, since it:
  - realises that *"people buy what they want, not what marketers think they need"*;

- finds out what the markets want; and
- uses innovation to find new ways to give that to the market in the most cost-effective manner possible.

- An entrepreneurial organisation can sell new or well-known products or services - but presented in a new way, or using new processes and technology, or aimed at new markets.
- Say's definition of an entrepreneur can thus be extended to include "someone who:
  - uses innovative thinking, in order to give something new to the market; and
  - creates wealth, by taking **calculated risks** in order to add value to products / services."
- Any type of organisation - new or existing, small or large, high-tech or no-tech, private or state owned, etc. - can be innovative and entrepreneurial, as illustrated by four examples:

Example	Entrepreneurial ?	Organisation Type	Comments
New hamburger stall, established in a street along several other fast food stalls.	No	Small, new, no-tech	It might be something new; the owners might take risk, but it is not innovative.
Specialist book shop, now also selling e-books via the internet.	Yes	Small, existing, no-tech	This is an existing type of business, but it offers something new (internet sales and e-books) to the market.
Military component maker, just trying to survive in a declining market.	No	Large, existing, medium-tech	Declining defence budgets make it increasingly harder for this business to survive.
Military aircraft manufacturer now also producing commercial light aircraft, components for civil aviation, and components for the motor industry.	Yes	Large, existing, high-tech	This business uses new thinking, with existing processes, for several new markets, to ensure their survival.

2.2 INTRAPRENEURSHIP VERSUS ENTREPRENEURSHIP

- There are two main routes whereby new products / services can be provided to the market:
  - from an **existing** (often large) organisation; or
  - by starting a **new** (mostly small) organisation.
- There are variations on these two routes - e.g. starting a new, almost autonomous business unit, within an existing organisation (a practice actively encouraged by some large organisations).

- However, these two routes represent the main alternatives amongst which an entrepreneur must often choose.
- To distinguish the two business routes, the term ***intrapreneurship*** is sometimes used to refer to innovative thinking about ways of doing new business within an existing organisation; and the term ***entrepreneurship*** is then restricted to innovative thinking about starting a new organisation and keeping it in business.
- However, the term *entrepreneurship* is mostly used in a broad sense, to also include intrapreneurship.
- Although the fundamentals of the two concepts are the same, namely **innovative thinking about product development and marketing**, it is important to realise that the two main routes available for entrepreneurs present different challenges, as illustrated by some examples:

	Existing Business	**New Business**
Typical age of organisation	Existing for long.	New.
Typical size of organisation	Large.	Small.
Typical size of projects	Any size.	Small to medium.
Typical management structure	Well established / Bureaucratic.	Loosely structured (if structured at all).
Ownership	Not the entrepreneur (intrapreneur).	The entrepreneur.
Risk for the entrepreneur	Low.	High.
Potential rewards for the entrepreneur	Low to medium.	High.
Typical availability of resources	High.	Restricted.
Consequences of decisions	Decisions can have far-reaching consequences for other parts of the organisation.	Most wrong decisions can be rectified quickly, without major impacts.
Decision-making freedom	• The intrapreneur's decisions are subject to approval by several others. • Quick reaction is often not possible. • Because of the inherent inertia of the large organisation, most bad ideas can be filtered out. • However, some good ideas are also filtered out.	• The entrepreneur is often the only or final decision-maker. • Quick reaction is possible, based on available information and often on intuition. • There is less of a filter action in the small organisation, which can cause bad ideas to be implemented.

2.3 INNOVATION IN ORGANISATIONS

- Innovation is a prerequisite for entrepreneurship, and these two concepts go hand-in-hand.
- There is a huge difference between being *inventive* and being *innovative*:
  - Invention is only the first step of innovation, namely to generate a new idea. Thomas Edison was inventive when he developed the light bulb, but it is well-known that he had difficulty to convert his inventions into money-making businesses.
  - Innovation involves new thinking about the full life cycle of a product - from concept to a final product on the market ("from cradle to grave"). Bill Gates and his colleagues are innovative in their thinking about software development and marketing.
- The following roles are typically involved in innovation (GALBRAITH 1982):
  - The *idea champion*, who generates the idea.
  - The *sponsor*, who nurtures the new concept and allocates resources to its further development.
  - The *implementers*, who transform the idea to a product through stages such as: idea → applied research → design → development → marketing → production → sales and distribution. (Also see ANGUS & GUNDERSEN 1997.)
  - The *godfather / orchestrator*, who supports and protects the idea higher up in the organisational hierarchy. The best *godfathers* are people who once were idea champions and sponsors themselves.
- In large organisations these roles are normally allocated to different people; while in small organisations the roles are normally assumed by one person.
- In large organisations there are often dedicated innovation teams in the form of well-established research and development (R&D) departments; while in small organisations innovation is often one of the many tasks of the owner or manager.
- Most large organisations have extensive resources to investigate many different ideas; while in small organisations innovative ideas must be screened much more carefully, since choosing the wrong idea for further development can ruin the whole organisation.
- Because of their more extensive resources, innovation in large organisations is often more successful than that in small organisations.
- However, small organisations are often more focused and dedicated, because of their limited resources.
- Both large and small organisations are important role players in the economy and in innovation:
  - Large organisations provide stability, and the opportunity for long-term research and development.
  - Small organisations can provide quick response times.
  - Large organisations can assume bigger risks with large research and development efforts.
  - Small organisations can focus on small and incremental innovations – which are often not worth the trouble for large organisations.

- Large organisations provide many job opportunities.
- Small organisations are often more efficient.
- Large organisations often use the products and services produced by small organisations.
- Small organisations often help large organisations to smooth their workloads.

- Innovation does not necessarily depend on organisation size, and it is not something that happens spontaneously.
- Innovation must be actively encouraged and nurtured.

2.4 COMMON FALLACIES ABOUT ENTREPRENEURSHIP

Some common misconceptions about entrepreneurship include:

- ***Entrepreneurs are doers, not thinkers***. Although an entrepreneur must be willing to "roll up the sleeves and work", a lot of careful thinking needs to be done first, so that the *right things* are *done first time right*. Only careful planning can reduce the entrepreneur's chances of failure.
- ***Entrepreneurs have to be chancers***. Starting a new venture should rely on careful thinking and planning, instead of jumping after every idea that seems to be good. Entrepreneurs do take risks, but these should be *calculated risks* and not merely taking chances in the hope that everything will work out.
- ***Entrepreneurs are born, not made***. McCLELLAND 1976 and DRUCKER 1985a have found from extensive observations and research that entrepreneurship is not necessarily an in-born trait, but that it can be learned.
- ***All you need to be an entrepreneur is money***. Money is a necessary, but not sufficient prerequisite to convert an innovative idea into a successful product. Without careful thinking and management, and without commitment, all the available money can soon be lost.
- ***All you need to be an entrepreneur is luck***. Entrepreneurship requires more hard work and urgency than it requires romanticism and luck. (It is said that the South African golfer Gary Player often remarks about his golf game: "The harder I practice, the luckier I get".)
- ***All you need to be an entrepreneur is a clever invention***. Invention is only the first step of innovation, which in turn is only a stepping stone for entrepreneurship.
- ***An honest person cannot be an entrepreneur.*** When SUNTER 1999 says that the entrepreneur must be *foxy*, he certainly does not mean *dishonest*, but rather intelligent and innovative. Dishonesty in business often comes back to haunt that business at very inappropriate times. Honesty and ethical management (BLANCHARD & PEALE 1988) is the only basis on which to build any long-term relationship - also with customers (products) and clients (services).
- ***Entrepreneurship is a high-tech thing.*** High-technology businesses, especially in information technology, often get a lot of attention. Because some clever technological invention is often the basis of a new business in this area, many people tend to associate entrepreneurship with high-tech. However, the majority of new businesses are not in the high-tech area (DRUCKER 1985b).
- ***There is an entrepreneurial profile*** (checklist) which can be used to determine with absolute certainty whether someone is an entrepreneur or not, and whether he/she will make a success of

a new business venture. Although such checklists - as shown in section 2.5.2 below - can be useful, it is not a guarantee of success.

2.5 ARE YOU INNOVATIVE AND ENTREPRENEURIAL?

2.5.1 Determine Your Innovative Abilities

- Use the following four scores to rate yourself according to the statements listed below (adapted from DAILEY 1995):
  - 1: The statement never describes me.
  - 2: The statement sometimes describes me.
  - 3: The statement often describes me.
  - 4: The statement always describes me.

STATEMENT	SCORE
I often have new and realistic product and business ideas (i.e. I am inventive).	
I can explain my ideas to others.	
It is important for me to have the opportunity to try my new ideas.	
I make things happen when I work on something.	
I can accomplish goals, even when my work conditions are difficult.	
I don't give up easily.	
Even though I know it is impossible to succeed with everything I do, that does not prevent me from aiming to always succeed.	
I don't measure success by the number of promotions which I get, but by the number of my ideas which is successfully converted to products / services.	
I rarely wait for instructions from my manager, even when my job seems unclear.	
I can decide what to do in my job, and I prefer to develop my own approach to my job.	
I don't have an abrasive personality.	
I am not at work to be popular, but to contribute to my organisation's success.	
I am not afraid to go against, or change, work rules if they stand in the way of efficiency or work progress.	
I prefer challenging and difficult work, even when I am uncertain of the outcome.	
I like work situations where I can use help and inputs from others; and I often facilitate new developments by combining the efforts of various people.	
TOTAL SCORE	

- The closer your overall score is to 60, the more likely you are to be an innovative type of person, who can operate in an entrepreneurial manner.

2.5.2 Determine Your Entrepreneurial Abilities

- Objectively answer the following questions; and allocate a score of 2 for each *yes* answer, a score of 1 for each *maybe* answer, and a score of 0 for each *no* answer:

QUESTIONS	SCORE
Are you innovative ? (Refer to section 2.5.1.)	
Are you willing to make personal sacrifices in order to start a business ?	
Do you have management (planning, organising, staffing, leading and control) abilities ?	
Do you have a strong desire to succeed, and to overcome several failures ?	
Do you have a clear vision of your goal, and can you explain it to others ?	
Do you have initiative, and can you assume responsibility for both success and failure ?	
Do you have access to some resources (either you own, or within your employer organisation, or borrowed) in order to get your business idea going ?	
Can you stick with a problem until you have found a good solution for it ?	
Do you normally pay attention to detail which is often missed by others ?	
Do you have an *internal locus of control* - i.e. do you believe that your own efforts contribute to your success ?	
Can you tolerate substantial uncertainty ?	
Do you believe in compiling a business plan as part of risk abatement ?	
Do you believe that failure is temporary and can be overcome ?	
TOTAL SCORE	

- The closer to 26 your final score is, the more entrepreneurial you are likely (but not guaranteed) to be.

2.5.3 Should You Start Your Own Business?

- Even if the above questionnaires indicate that you are both innovative and entrepreneurial, positive outcomes do not necessarily indicate that you are ready – now, or ever - to start your own business.
- Before deciding whether to start a new business or not, it is important to gather as much information as possible about the intended business and its potential markets - as addressed in chapter 3.
- Potential entrepreneurs should never be discouraged, since they play a very important role in any economy.
- However, the romanticism often surrounding entrepreneurship should be removed, in order that a rational decision can be made regarding whether to:
    - act *entrepreneurially*, and start a new small business from scratch; or

- act *intrapreneurially*, within the confines of an existing large organisation; or
- not act at all, but to rather look for a different opportunity.

- The following table shows some pros and cons of acting intrapreneurially within an existing large organisation, and of starting a new small business:

	PROS	CONS
Existing large organisation	• It is easier to be entrepreneurial with the support of a large employer than it is to "go it alone". • It is often said that it is better to be a small gear in a large machine, than to be the only gear in a small machine. • Large organisations normally provide job security.	• It can be difficult to be entrepreneurial in a large organisation when the organisational culture is bureaucratic. • The long decision-making processes of large organisations can be very frustrating. • Innovative employees are not always rewarded according to their contribution, but often according to some rigid salary scales.
New small organisation	• New ideas can be tested quickly. • It can be very rewarding (not only financially) and satisfying to start a small business, and to make a success of it. • Large autonomy and decision-making freedom (LYNAS & DORRIAN 1987). • Innovative people often find it difficult to work within the confines and rules of a large organisation, and to report to a bureaucratic supervisor. Starting a small business can alleviate these difficulties.	• It can be very lonesome in a small business, and very difficult to assume the different roles of idea champion, sponsor, executor, and godfather - all in one, and all equally well. • Often, small businesses are overburdened with administrative duties – e.g. bookkeeping on various types of taxes to be paid to local, state, and national governments. • An entrepreneur starting a new business often carries a large financial risk. • When a small business starts growing, it needs to appoint staff. Entrepreneurs often find it difficult to manage other people, instead of keeping themselves busy with new innovations.

2.6 SELECTED EXAMPLES OF ENTREPRENEURSHIP

2.6.1 Introduction

- This section briefly describes some successful entrepreneurial actions in both large and small

organisations.

- More detailed examples are provided by DRUCKER 1985b and GILDER 1984; while a source such as REVEL 1981 provides ideas for starting new businesses.
- The examples given in this section were randomly selected, and are only a small fraction of the numerous success stories available in this regard.
- The reader must be careful though: it is often said that for every success story there are at least ten stories of failures in similar business areas.
- Business failures tend to be forgotten more quickly.
- Students must therefore not be misled to think that any innovative business idea will automatically lead to success.

2.6.2 The IBM Personal Computer

- In the early 1980s, computer business was a major growth industry, with demand doubling every year (POWELL & POSNER 1984).
- IBM did very well in this market, while Texas Instruments (TI) lost a lot of money.
- The major difference between IBM and TI was in the way in which project teams were created and managed:
  - IBM set up a task force responsible for the personal computer (PC), as an independent business unit.
  - This business unit was not subject to the same rules as the normal business.
  - The IBM team could use non-IBM parts and resources if they considered it necessary or better.
  - IBM granted its project team the freedom to make use of human intelligence at all levels.
  - TI, on the other hand, operated in a strict top-down, autocratic manner.
  - TI project managers were demoralised by constant overruling at higher levels.
  - TI was not making full use of the intelligence of their teams, but overregulated the project – and this resulted in failure.

2.6.3 3M Post-It Note Pads

- Arthur Fry, a chemical engineer employed by Minnesota Mining and Manufacturing (3M) was annoyed by his bookmarks slipping out of his hymn book in church.
- He remembered that a colleague, Spence Silver, had discovered an adhesive with very low sticking power - making it useless as an industrial adhesive.
- Since 3M allows employees to spend up to 15% of their work time on independent projects, Fry spent some of this time on inventing the now familiar self-sticking 3M Post-It note pads, which are widely used.
- Soon after 3M started producing these note pads, it had sales in excess of $100 million from it.

2.6.4 Hewlett-Packard Video Monitor

- In 1982, engineer Charles House was given a medal for *"extraordinary contempt and defiance beyond the normal call of engineering duty"* by his employer Hewlett-Packard (HP).
- House had ignored an order from HP co-founder David Packard to cease development of a high-quality video-monitor.
- Despite this order, House moved forward and developed a very successful product, which was *inter alia* used to track NASA's manned moon landings.
- Early marketing estimates indicated that only 30 units could be sold – resulting in Packard stopping the project.
- However, within five years, 17000 monitors had been sold, for more than $35 million.

2.6.5 McDonald's Restaurants

- Although the McDonald's restaurant chain did not invent a new product, Ray Kroc invented new techniques to produce and market well-known products.
- These techniques include:
  - Focusing on "what is value to the customer".
  - Standardising the product.
  - Setting and implementing training standards.
- The international success of McDonald's illustrates that there is scope for innovative thinking over the full product life-cycle.

2.6.6 Internet Security

- The advent of the internet has brought many opportunities for innovative thinking.
- Mark Shuttleworth, a young South African computer enthusiast started a business, Thawte Consulting, in the late 1990's, which provides "secure web site" certification to companies trading over the internet.
- Thawte evaluates businesses trading over the internet, and issues authenticity certificates to those businesses who are found to be reliable traders.
- Buyers on the internet can then rest assured that they buy from a trustworthy supplier if such a supplier can render one of Thawte's certificates.
- With ever increasing internet-based trading, there was a huge need for this type of service; and Shuttleworth had the innovative thinking to make it work.
- In 1999, Shuttleworth sold his business for more than US$1 billion to the American company VeriSign.

2.6.7 Japanese Quality Circles

- The Japanese management technique of *quality circles* involves regular brain storming sessions, where employees get the opportunity to make proposals about new ways of doing things, potential new solutions for problems, and potential new business ideas.
- This technique recognises that:
  - Employees often have better business ideas than their managers, because the employees are closer to the problems to be solved by the organisation.
  - Project teams achieve the best results when people have the chance to contribute their own ideas, and when the people have the responsibility for making important decisions.
  - Allowing employees to freely communicate their ideas, makes them feel in control and gives them joint ownership of new ventures.
- The quality circle concept thus encourages individuals to come up with innovative ideas and to try these out.
- No idea is rejected outright, but all ideas are systematically evaluated.
- This is an excellent way to foster innovation and entrepreneurship within existing large organisations.

3. DECISION-MAKING ABOUT BUSINESS OPPORTUNITIES

3.1 DECISION-MAKING TOOLS

- In order to make rational decisions on business opportunities, information and careful analysis are required.
- Typical decisions required about business opportunities include:
  - Whether the opportunity is viable or not.
  - If the opportunity is viable, whether to explore it within an existing organisation, or to start a new business.
- Various methods can be used to systemise and analyse available information about a business opportunity, e.g.:
  - Market research - mainly aimed at establishing the viability of a business opportunity.
  - Strengths, weaknesses, opportunities and threats (SWOT) analysis - to determine the business environment and the internal factors of the *existing business route*, and those of the *new business route*.
  - Trade-off studies - to objectively compare the *existing business route* with the *new business route* in terms of a value system.
- These three tools for assisting rational decision-making on new business opportunities are addressed in this chapter.

3.2 MARKET RESEARCH

3.2.1 Introduction

- Market research represents the voice of the consumer in a business; and its purpose is to help a business make better decisions about:
  - the viability of a business opportunity; and
  - the development and marketing of products and/or services to satisfy the needs of a viable business opportunity.
- The products / services can be:
  - existing products / services, aimed at existing markets - but involving new production and/or marketing techniques, or
  - existing products / services, aimed at new markets, or
  - new products / services, aimed at existing markets, or
  - new products / services, aimed at new markets.
- Market research is an elaborate activity, addressing at least the following aspects, aimed at establishing viability of the business opportunity, and suitable marketing strategies:
  - characteristics of the product / service;
  - the macro-environment (demographics, economic trends, political and legal influences, technological developments, and socio-cultural trends);
  - buyer needs and buying behaviour;
  - market segments;
  - competitors;
  - analysis of the above aspects and matching them with the organisation's own abilities; and
  - reaching conclusions about suitable marketing strategies.
- There is a subtle difference between *market research* and *marketing research*. The latter is a sub-set of the former, specifically aimed at defining the best marketing strategies, once the market had been characterised.
- Market research for really new products can be very difficult to do, since:
  - customers will not have any basis to compare the new product with; and
  - the idea can be exploited by competitors.

3.2.2 Market Characterisation

- Before information can be gathered and analysed as part of market research, the information needs and the potential information sources must first be defined.
- It is important to seek reliable information sources, and not to merely focus on the easily accessible ones.
- Information can be obtained from both internal sources (e.g. sales and cost forecasts) and

external sources.

- Internal information can be obtained by questioning relevant people within the organisation, or from internal reports.
- Primary external information sources include consumers, retailers, and wholesalers; while secondary external sources include government and trade association publications, and media reports.

3.2.2.1 Research Methods

- Once information needs and potential information sources had been defined, research methods for gathering the information must be defined; and two main types of research are commonly used for this purpose:
  - **Exploratory research**, which uses secondary external information, case studies, and interviews with knowledgeable people in order to learn more about the nature and scope of the market. Focus groups (typically 6 to 12 consumers discussing potential new products / services) are also often used for exploratory research.
  - **Conclusive research**, which is used to test alternative product / service concepts. It either entails descriptive studies, using available demographic, use pattern, and other statistics; or it entails experimental research such as small-scale test markets.

3.2.2.2 Questioning and Observation

- The two basic ways to gather primary external information are through questioning and observation.
- *Questioning* involves the use of questionnaires, or approaching individuals and asking them direct questions.
- *Observation* can be used to gather information from checkout counters in a shop, for example.
- Although questioning has definite disadvantages, such as people being asked leading questions, or people giving what they think the desirable answers are (BOYD & WALKER 1990), it is by far the most commonly used information gathering method for market research.

3.2.2.3 Sample Design

- Sample design determines how respondents are identified and chosen for questioning; and the first step in this regard is to define the universe or population being studied - i.e. the group of potential buyers of the new product / service.
- Since markets develop with time, a time frame must usually also be coupled to the population to be studied.
- The next step is to determine how a sample will be chosen from the population, and there are three options:
  - **Random sampling**, whereby every unit in the population has an equal probability of being selected. With this method, the results can be extrapolated to represent the whole population.
  - **Non-probability sampling**, where the sample is not an average representation of the total population; and where the results cannot be extrapolated with certainty.

- **Quota sampling**, whereby the sample is chosen (not randomly) to parallel the population - e.g. the sample will have the same percentage students as the total population, and the same percentage individuals within a specific income bracket as the total population, etc.

3.2.3 Market Research Report

Once the market had been characterised (refer to section 3.2.2 above), a Market Research Report (GOUWS & GOUWS 2006) can be compiled, containing a description of:

- Methods used for information gathering.
- The information gathered.
- Analysis of the information.
- Conclusions regarding:
  - viability of the business opportunity; and
  - actions required to successfully market the product / service, or alternatively to redeploy resources towards more profitable options.

3.3 STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS ANALYSIS

3.3.1 Introduction

- Strengths, weaknesses, opportunities and threats (SWOT) analysis is used to characterise:
  - Threats and opportunities in an organisation's business environment - by means of an *environmental threats and opportunities profile* (ETOP).
  - Strengths and weaknesses within the organisation - by means of a *strategic advantages profile* (SAP).
- The ETOP and the SAP are combined in order to match strengths with opportunities, and to decide how to prevent threats and how to overcome weaknesses.
- SWOT analysis can be used to compare the business environment and the internal factors of the *existing (intrapreneurial) business route* with those of the *new (entrepreneurial) business route.*
- In order to make such a comparison, an ETOP, SAP, and SWOT must be compiled for both the existing business and for the potential new business.
- By comparing the two sets of results, a decision can be made whether to pursue the business opportunity within an existing organisation, or whether to start a new business, or whether to abandon the opportunity.
- The procedures for compiling the ETOP, SAP, and SWOT for a business are summarised in the following three sections.

3.3.2 Environmental Threat and Opportunity Profile (ETOP)

- Identify all external factors which might have a significant influence on the business opportunity.
- It is convenient to do this in different sectors, such as International (e.g. foreign exchange rates), Macro-economic (e.g. taxes, government policies), Micro-economic (e.g. supply and demand, salaries for personnel, labour structures), Socio-economic (e.g. demographics of consumers), Market (e.g. customer types and numbers, competitors), Suppliers (e.g. number, stability, reliability), etc.
- Then identify potential threats and opportunities which might result from each factor, analyse / describe each of these factors, and rate them in terms of importance.
- The following table shows a structure for compiling an environmental threats and opportunities profile (ETOP).
- The numbers under *relative importance* can typically range from 1 to 5 - with 5 being very important, and 1 being slightly important. (This is a subjective rating, which can be made more objective, by using methods similar to that described in section 3.4 below.)

Environmental Threat and Opportunity Profile				
Sector	**External Factors**	**Threat (T) / Opportunity (O)**	**Analysis**	**Relative Importance**
Interna-tional	Expected depreciation of foreign exchange rate	O	• More income in local currency terms from exported products. • Exports constitute 70% of revenue.	4
		T	• Imported inputs more expensive. • Imported inputs only 5% of input costs.	1
	.....	.....	.....	.....
Macro-econo mic	.....	.....	.....	.....
.....	.....	.....	.....	.....

3.3.3 Strategic Advantage Profile (SAP)

- Identify all internal factors which might have a significant influence on the business opportunity.
- It is convenient to do this in different sectors, e.g. abilities in Research, Development, Resources, Management, Personnel, Production, Marketing, etc.
- Identify potential strengths and weaknesses which might result from each factor, analyse / describe each of these factors, and rate them in terms of importance.
- The following table shows a structure for compiling a strategic advantages profile (SAP):

Strategic Advantage Profile				
Sector	**Internal Factors**	**Strength (S) / Weakness (W)**	**Analysis**	**Relative Importance**
Research	Series of recent new inventions by the organisation	S	Could be the beginning of a series of new products and refinements	4
		W	Large negative cash flow on short term for patent registration costs.	3
	.....	.....	.....	.....
Developm ent	.....	.....	.....	.....
Production	.....	.....	.....	.....
.....	.....	.....	.....	.....

3.3.4 SWOT Analysis

- Combine the environmental threats and opportunities profile (ETOP), and the strategic advantages profile (SAP) into a strengths, weaknesses, opportunities and threats (SWOT) table:

Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis			
STRENGTHS		**WEAKNESSES**	
Description	**Relative Importance**	**Description**	**Relative Importance**
.....	.....	.....	.....
.....	.....	.....	.....
OPPORTUNITIES		**THREATS**	
Description	**Relative Importance**	**Description**	**Relative Importance**
.....	.....	.....	.....
.....	.....	.....	.....

- (GOUWS & GOUWS 2006 describe a framework for a SWOT analysis report.)
- ETOP, SAP, and SWOT tables must be compiled separately for the *existing business route* and for the *new business route*.
- For each case, decisions can then be made regarding:
  - a matching of strengths with opportunities;
  - protection against threats; and
  - overcoming of weaknesses.
- Once the two options had been analysed separately, they can be compared in order to make a decision on whether to explore the opportunity within an existing business, or whether to start a

new business for this purpose.

- Such decision-making can be formalised by means of a trade-off study.

3.4 TRADE-OFF STUDY

3.4.1 Introduction

- A *trade-off* is performed in order to objectively compare different solutions to a problem, or different courses of action - e.g. whether to explore an opportunity within a large existing organisation or as a new business venture.
- The aim of a trade-off is to find the most suitable solution **in terms of a pre-defined value system**.
- There are many different techniques to perform trade-off studies (e.g. RUBINSTEIN & FIRSTENBERG 1995), but most of them follow a similar pattern:
  - a description of the different available options for solving a specific problem;
  - a list of decision criteria to be used for choosing amongst the options;
  - a quantification of the decision criteria;
  - an evaluation of the options in terms of the decision criteria;
  - a ranking of the options; and
  - recommendations regarding the most suitable solution for the stated problem.
- Since the outcome of the trade-off process strongly depends on the value system (decision criteria and quantification thereof), different people can reach different conclusions from a trade-off, depending on the value system used.
- To remove personal bias from the value system, it is important to involve as many as possible of those who have an interest in the outcome of the trade-off process - provided that they have knowledge about the specific decision-making problem - in compiling the value system and in doing the trade-off.
- Often the process of identifying options, deriving a value system, evaluating the options, and reaching conclusions is more important than the conclusion itself, because it forces all role players to think about various aspects of the problem to be solved.
- (GOUWS & GOUWS 2006 describe a framework for a trade-off study report.)

3.4.2 Definition of Options

- For pursuing a new business opportunity, the two main options are:
  - starting a new business; or
  - operating within an existing business.
- These two options can be compared, by means of the trade-off process described below.
- If *starting a new business* is the chosen option, a further choice reduction, according to the procedure described below, should be done in order to decide between:

- starting a new business to co-operate with another business; or
- starting a new business unit within an existing organisation; or
- starting a totally independent new business.

- If *operating within an existing business* is the chosen option, a further choice reduction should be done in order to decide between:
  - starting a new business unit within an existing organisation; or
  - adding the new business to an existing business unit within the existing organisation.

3.4.3 Value System

- Define the criteria in terms of which the identified options will be evaluated, e.g.:
  - Low Risk.
  - High Availability of Resources (money, materials, machines and manpower – the "four Ms").
  - High Job Satisfaction.
- There can be other decision criteria, depending on the situation and on the person doing the analysis.
- Once identified, the decision criteria have to be weighted in order to determine their relative importance.
- The weighting can be done as follows (GOUWS & GOUWS 2006):
  - A matrix is compiled with the decision criteria listed in the top row, and in the left column (refer to the following table, where three criteria are compared as an example).
  - In this matrix, different pairs of decision criteria are compared with each other. For each pair of criteria being compared, a total rating of 10 must be allocated amongst the two criteria. That allows for eleven levels of importance of one parameter relative to another (10+0; 9+1; 8+2; 7+3; 6+4; 5+5; 4+6; ... ; 0+10). If criterion X is considered just as important as criterion Y, then each is allocated 5. If X is slightly more important than Y, then X is allocated 6, while Y gets 4 (or *vice versa)*; etc.
  - The comparison is done cell by cell, staying **below** the main diagonal of the matrix. In each cell, the parameter listed at the top of the column is compared with the parameter listed left of the specific row. Depending on the perceived importance of the parameter listed at the top of the column, relative to the one listed left of the specific row, a number between 0 and 10 is allocated in the specific cell. The mirror image of the specific cell (i.e. a cell **above** the diagonal, linking the same two decision criteria) gets the 10's complement of the number allocated below the diagonal. (This process is easily done when a computerised spreadsheet is used.)
  - After all the pairs have been compared and rated (and the mirror images allocated the 10's complements), the numbers within each column are added to provide the total rating for each of the parameters listed at the top of the columns. These ratings are then expressed as percentages.
- The following table shows an example of a comparison of decision criteria: (Typically more than

three criteria will be compared. It was restricted to three here in order to keep the example simple.)

	Low Risk	High Resource Availability	High Job Satisfaction
Low Risk	---	4 *[10 - 6]*	3 *[10 - 7]*
High Resource Availability	6	---	5 *[10 - 5]*
High Job Satisfaction	7	5	---
Sum of ratings	13 *[6 + 7]*	9 *[4 + 5]*	8 *[3 + 5]*
Weight [%]	43 *[13/(13+9+8)] x100*	30 *[9/(13+9+8)]x100*	27 *[8/(13+9+8)]x100*

- In the example shown in the table above:
  - Having a low risk is considered slightly more important than having high resource availability, and a rating of 6 is therefore allocated in the column under risk and the row next to resource availability. The 10's complement of this rating, namely 4, is allocated in the column under resource availability and the row next to risk.
  - Having a low risk is considered more important than having high job satisfaction, and is allocated a rating of 7 in the column under risk and the row next to job satisfaction. The 10's complement of this rating, namely 3, is allocated in the column under job satisfaction and the row next to risk.
  - Having high resource availability is considered just as important as having high job satisfaction, and is therefore allocated a rating of 5 in the column under resource availability and the row next to job satisfaction. The 10's complement of this rating, namely 5, is allocated in the column under job satisfaction and the row next to resource availability.
- Note that the ratings given in the example above are subjective - i.e. it strongly depends on the values of the person doing the ratings; and therefore it reflects a personal value system. To remove personal bias, the ratings can be decided upon through discussion in a group, or it can be done independently by different individuals, before being combined by a process of averaging.
- The sum of ratings in each column is calculated and expressed as a percentage of the sum of all the columns' totals (called the *weight* of the specific decision criterion).

3.4.4 Trade-off

- Analyse the different options qualitatively and quantitatively, as shown by way of an example in the next two tables. (If more than two high-level options were identified, each of the identified options identified would have such a table.)
- Column 2 contains the weights of the decision criteria, as derived in the previous table.

- In Column 3, the specific option is evaluated qualitatively, in terms of each of the decision criteria.
- Column 4 contains ratings - based on the qualitative analysis in column 3 - indicating how well the specific option satisfies each of the decision criteria. Again, this rating can be done by experts as a group activity, or individually and then averaged. The following ratings can be used:
  - 0: the concept is completely **inadequate** to satisfy the requirements;
  - 1: the concept is a **very poor** solution to satisfy the requirements;
  - 2: the concept is a **poor** solution to satisfy the requirements;
  - 3: the concept is a **reasonable / tolerable** solution to satisfy the requirements;
  - 4: the concept is a **good** solution to satisfy the requirements;
  - 5: the concept is a **very good / ideal** solution to satisfy the requirements.
- Column 5 in each of the two tables below contains the weighted ratings per performance parameter, where *weighted rating = weight x quantitative rating / 5* (division by 5 in order to normalise in terms of the maximum rating which can be allocated). The total weighted rating for each option is also calculated.
- The following table shows an example evaluation for the high-level option ***starting a new business***:

1	2	3	4	5
Performance Parameter	**Weight [%]**	**Qualitative Analysis of *Starting a New Business***	**Quantitative Rating (0 - 5)**	**Weighted Rating [%]**
Risk	43	The risk associated with starting a new business is high, but tolerable.	3	25.8
Resource availability	30	Resources are limited for a new business.	2	12.0
Job satisfaction	27	Job satisfaction will be high in a new independent business.	5	27.0
Total	**100**			**64.8**

- The following table shows an example evaluation for the high-level option ***operating within an existing organisation***:

1	2	3	4	5
Performance Parameter	**Weight [%]**	**Qualitative Analysis of *Operating within an Existing Organisation***	**Quantitative Rating (0 - 5)**	**Weighted Rating [%]**
Risk	43	The risk associated with	4	34.4

		starting a new business unit within the existing business is low (but not zero).		
Resource availability	30	Resources are not too limited in the large existing business.	4	24.0
Job satisfaction	27	Job satisfaction is expected to be low, because of the existing organisation's bureaucracy.	1	5.4
Total	**100**			**63.8**

3.4.5 Comparison and Recommendations

- After all the options had been analysed in individual tables similar to those in section 3.4.4, a table summarising all the options' ratings is compiled:

Performance Parameter	**Weight [%]**	**Option 1 (New Business)**	**Option 2 (New Business Unit in Existing Organisation)**	**.....**	**Option N**
Risk	43	25.8	34.4		
Resource availability	20	12.0	24.0		
Job satisfaction	27	27.0	5.4		
Totals [%]	**100**	**64.8**	**63.8**	.....	.....

- Conclusions and recommendations can then be made from these summarised results - e.g.:
  - Since both option score in the mid 60% range, it is clear that neither one is an *ideal* solution.
  - Furthermore, since the two options have such a very close rating, it is obvious that a choice between the two is not clear-cut.
  - However, option 1 seems to be a slightly better solution in terms of the defined value system and in terms of the analysts' ratings.
  - Risk will be higher, and resources scarcer when option 1 is chosen, but job satisfaction will be higher.
- Remember that the process of getting the final result of the trade-off is often more important than the result itself, since the process helps the analyst to consider various factors of importance in a structured manner.
- Once the two high-level options had been compared, and one of them was chosen, the next step is to repeat the trade-off process for the sub-options defined earlier, which in this case are:
  - starting a new business to co-operate with another business; or
  - starting a new business unit within an existing organisation; or
  - starting a totally independent new business.

- The same value system will be used, in order to choose the most suitable one from these options.

4. STRATEGIES FOR NEW BUSINESS OPPORTUNITIES

4.1 INTRODUCTION

- Once a new business opportunity had been found to be viable (by means of market research - section 3.2) and once it had been decided (by means of SWOT analysis - section 3.3, and trade-off studies - section 3.4) along which route (existing- or new organisation) to pursue a viable option, suitable business strategies must be chosen.
- Different business strategies can be chosen for pursuing a new business opportunity.
- The trade-off process described in section 3.4 above can also be used to choose amongst the different strategic options addressed in this chapter.

4.2 DIFFERENT COMPETITIVE STRATEGIES

- One approach to business strategy is to focus on the positioning of the business relative to its competitors.
- Four main competitive positions (which are not mutually exclusive, but which can be combined) can be assumed, as described below. (Refer to DRUCKER 1985b, for an alternative description of similar strategies.)
- **Overall cost leadership**
  - This strategy relies on unit cost of products or services rendered by the organisation to be significantly lower than that of competitors' products or services.
  - This typically results from a high market share, and economies of scale (where fixed costs are distributed over more units produced, thereby reducing unit cost).
  - For this strategy to work, the organisation must have a significant market share, and it must continuously reduce costs.
- **Differentiation**
  - This strategy uses market segmentation, and supplies unique products or services to one or more of the identified market segments.
  - Different prices are also charged in each market segment.
  - The main aim is not lower cost than competitors, but to produce something unique.
  - The difference can be real or imaginary - as long as it is perceived by the customers.
- **Focus**
  - This strategy identifies market niches (e.g. special attention to customers, fast delivery, special products, etc.) and avoids confrontation with competitors.
  - It is not a high volume market, and it is not aimed at achieving the largest market share.
- **Go with the stream**

- With this strategy, the organisation continuously adapts its market position according to market changes.
- It normally results in poor performance.

4.3 STRATEGIES FOR BUSINESS GROWTH

- Another approach to defining organisational strategy is to focus on business growth.
- Four main growth options can be followed, as described below.
- **Prospector**
  - The main concern with this strategy is to find new market opportunities.
  - Prospectors are normally concerned with pursuing business growth by differentiated or low cost products.
  - Many organisations want to be classified as prospectors, while they are in fact reactors.
- **Analyser**
  - Analysers focus on sophisticated internal information systems and organisational structures, without doing much *prospecting* for new business.
  - An analyser typically starts from the base of a strong core business, and then expands into related markets .
- **Defender**
  - Defenders only try to maintain their current market positions.
  - They normally operate in mature markets, and want to maintain their existing customers and products / services.
- **Reactor**
  - Reactors deal with circumstances as they arise.
  - They act like prospectors, analysers, or defenders - as dictated by circumstances.

4.4 COMPETITIVE POSITION VERSUS BUSINESS GROWTH

The two approaches to business strategy, as described in sections 4.2 and 4.3 above, can be combined as shown in the following table:

	Prospector	**Analyser**	**Defender**	**Reactor**
Overall cost leadership	Constant new and low cost offerings in existing and new markets.	Well considered low cost offerings in existing and related markets.	Maintain low cost in existing markets.	Try to adapt to new markets, with low cost offerings.
Differentiation	Constant new and differentiated	Well considered differentiated offerings	Maintain difference in	Try to adapt to new

	Prospector	Analyser	Defender	Reactor
	offerings in existing and new markets.	in existing and related markets.	existing markets.	markets, with unique offerings.
Focus	Constant new offerings in existing and new specialist (niche) markets.	Well considered differentiated offerings in existing and related specialist (niche) markets.	Maintain difference in existing specialist (niche) markets.	Try to adapt to new specialist (niche) markets.
Go with the stream	Explore new markets when they arise.	Expand into existing and related markets if the opportunity arises.	Defend existing markets.	Change direction as dictated by circumstances.

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6. SELF-ASSESSMENT

6.1 TRUE / FALSE QUESTIONS

Indicate which of the following statements are TRUE and which are FALSE.

1. An entrepreneur shifts resources from an area of higher to an area of lower productivity.
2. An entrepreneurial organisation only sells new products or services.
3. The term ***intrapreneurship*** is sometimes used to refer to innovative thinking about ways of doing new business within an existing organisation.
4. Being *inventive* is the same as being *innovative*.
5. In small organisations innovation is often one of the many tasks of the owner or manager.
6. All you need to be an entrepreneur is a clever invention.
7. Market research is used to establish the viability of a business opportunity.
8. *Market research* and *marketing research* is the same thing, merely done by different people.
9. SWOT analysis can be used to compare the business environment and the internal factors of the *existing (intrapreneurial) business route* with those of the *new (entrepreneurial) business route.*
10. An Environmental Threat and Opportunity Profile identifies all external factors which might have a significant influence on a business opportunity.
11. A Strategic Advantage Profile identifies all external factors which might have a significant influence on a business opportunity.
12. The aim of a trade-off is to motivate a choice that had been made.
13. There are always three decision criteria for a trade-off study.

14. The process of getting the final result of a trade-off study is often more important than the result itself.
15. One approach to business strategy is to focus on the positioning of the business relative to its competitors.
16. Another approach to defining business strategy is to focus on business growth.
17. Differentiation uses market segmentation, and supplies unique products or services to one or more of the identified market segments.
18. The "go with the stream" strategy has the least risk, and normally produces the best result.
19. Many businesses want to be classified as reactors, but are in fact prospectors.
20. Defenders only try to maintain their current market positions.

6.2 MULTIPLE CHOICE QUESTIONS

Choose the one correct answer for each of the following questions:

1. Which of the following should not be part of an entrepreneur's make-up:
   a. The ability to assume calculated business risks.
   b. The ability to make money in clever (even dishonest) ways.
   c. The ability to use innovative thinking, in order to give something new to the market.
   d. The ability to work long hours.
2. Which of the following types of organisation are best suited to be innovative and entrepreneurial:
   a. New small business.
   b. Existing businesses with extensive resources.
   c. Large high-tech businesses.
   d. All the above.
3. The best route whereby new products / services can be given to the market are:
   a. From an **existing** (often large) organisation.
   b. By starting a **new** (mostly small) organisation.
   c. Neither (a) nor (b).
   d. Either (a) or (b).
4. The term *entrepreneurship*:
   a. Is mostly used in a broad sense, to also include intrapreneurship.
   b. Refers to innovative thinking about selling products.
   c. Is concerned with product development and marketing.
   d. None of the above.
5. The differences between being *inventive* and being *innovative* include:
   a. Invention is the final step of innovation.
   b. Innovativeness refers to the generation a new idea.
   c. Innovation involves new thinking about the full life cycle of a product.
   d. All the above.
6. Which of the following is not one of the roles typically involved in innovation:

a. The *idea champion.*
b. The *sponsor.*
c. The *implementers.*
d. The *orator*.

7. Which of the following is a common misconception about entrepreneurship ?
   a. Entrepreneurs are doers, not thinkers.
   b. Entrepreneurs are born, not made.
   c. All you need to be an entrepreneur is money and luck.
   d. All the above.
8. Typical decisions required about business opportunities include:
   a. Whether the opportunity is viable or not.
   b. Whether to explore it within an existing organisation, or to start a new business.
   c. Both (a) and (b).
   d. None of the above.
9. The best method to systemise and analyse information about a business opportunity include:
   a. Market research.
   b. SWOT analysis.
   c. Trade-off studies.
   d. All the above.
10. The purpose of market research is to help a business make better decisions about:
    a. The competitors' policies on salaries.
    b. The viability of a business opportunity.
    c. The financial future of the directors.
    d. All the above.
11. The purpose of a SWOT analysis is to characterise:
    a. Threats and opportunities in an organisation's business environment.
    b. Strengths and weaknesses within the organisation.
    c. Both (a) and (b).
    d. None of the above.
12. SWOT analysis can also be used for:
    a. Matching of strengths with weaknesses.
    b. Protection against problems.
    c. Customers' weaknesses.
    d. All the above.
13. The steps in a trade-off study include:
    a. Description of available options for solving a specific problem.
    b. Arbitrary ranking of the decision criteria.
    c. Subjective evaluation of the options.
    d. All the above.
14. Which of the following is not a business strategy focused on the positioning of the business

relative to its competitors ?

a. Overall cost leadership.
b. Differentiation.
c. Prospector.
d. Go with the stream.

15. Overall cost leaderships is best described by:
    a. Relying on unit cost being significantly lower than that of competitors' products or services.
    b. A high market share.
    c. Economies of scale.
    d. All the above.
16. Differentiation as a business strategy is best described by:
    a. Market segmentation.
    b. Niche markets.
    c. Continuous adaptation according to market changes.
    d. All the above.
17. Being a business prospector means:
    a. The main concern with this strategy is to maintain existing market opportunities.
    b. The business' internal organisation is of more importance than anything else.
    c. Pursuing business growth by differentiated or low cost products.
    d. None of the above.
18. Being an analyser means:
    a. Focusing on sophisticated internal information systems and organisational structures.
    b. Doing much *prospecting* for new business.
    c. Starting from the base of a strong core business, and then expanding into unrelated markets.
    d. All the above.
19. Being a defender means:
    a. Expanding into new markets.
    b. Operating in mature markets, and maintaining existing customers and products / services.
    c. Dealing with circumstances as they arise.
    d. All the above.
20. Which of the following is not a prerequisite for entrepreneurship:
    a. Innovation.
    b. Commitment.
    c. Dishonesty.
    d. Hard work.

6.3 SHORT ESSAY QUESTIONS

Write an essay of 300 to 400 words on one of the following topics. Do not merely copy the course notes, but write the essay **in your own words** such that your understanding of the topic becomes

clear.

1. Discuss the differences between invention and innovation; and between intrapreneurship and entrepreneurship.
2. Discuss the role of market research for the entrepreneur.
3. Discuss the role of SWOT analysis for the entrepreneur.
4. Discuss the role of trade-off studies for the entrepreneur.
5. Describe how you would decide whether to start a new small business or not.
6. Discuss different strategies that can be followed by a new business.

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