Business Studies

University of Cambridge

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Contents

1 Idea Development

Job of an entrepreneur is to reduce the risk by reducing the uncertainty in a business proposition

- **Cambridge Phenomenon**: Explosion of companies across scientific industries in the last fifty years.
- Global GDP increasing year on year consistently over time
- VC funding has continuously increased year on year

1.1 Growth Drivers

1. Mainframe - 1960
2. Minicomputer - 1980
3. PC - 1990
4. Desktop Internet - 2000
5. Mobile Internet - 2010

1.2 Human-Computer Interaction Technology Development

1. Punch Cards - 1832
2. QWERTY keyboard - 1872
3. Electromechanical Computer - 1941
4. Electronic Computer - 1943
5. Paper Tape Reader - 1944
6. Mainframe Computers - 1948
7. Trackball - 1952
8. Joystick - 1967
9. Microcomputers - 1974
10. Portable Computer - 1975
11. GUI (window based) - 1981
12. Commercial Use of Mouse - 1983
13. Mobile Computing (PalmPilot) - 1996
14. Touch - 2007
15. Voice on mobile - 2011
16. Voice on Connected / Ambient devices - 2014

1.3 Why you?

1. Barriers to market entry
2. Barriers to competition
3. Unique advantages

1.4 Why now?

1. Money availability
2. Support
3. Infrastructure
4. People
5. Government
6. Society attitude

1.5 Why do it?

1. Wealth generation
2. Better things
3. Make a difference

1.6 Properties of an Entrepreneur

- Someone who starts a project without having the full resources or knowledge - works with estimation, guess and gut feel
- Penchant for risk taking (market, technological and financial risk)
- N.B. Value accrues as the risk lessens

1.7 Types of companies

Companies can either be high profit (with organic growth and financed by debt) or high growth (finance with equity and build up a community)

1.8 Investor Criteria

1. **Market**: is there a sustainable market need
2. **Technical**: is there a defensible technological advantage
3. **People**: strong team
4. **Financial**: need believable plans + 60% IRR
5. **Major Risks**: Framework to understand and manage risks

1.9 Risks

1. Market Need - this is the largest risk
   - Why do people need it and why do they need your thing
   - What is the route to market
   - (1) **Global**, (2) **Sustainable**, (3) **Under-served**, (4) **Growing** market need
   - Describe in terms of **Features, Advantages and Benefits**
     - Advantages described in terms of: (1) Intellectual Property, (2) Defensible technological leadership

1.10 Plans

1. Business Plan
   - Executive Summary and Funding Requirement
   - Concept
   - Market: (1) Global market size and need, (2) Sustainability, (3) Competition, (4) Marketing plans
   - Team
   - Technology and IPR
     - **Patents** offer an absolute right to invention (defined by the Berne convention). The item must be novel and reducible to hardware. Important to note that they are expensive to acquire and it's sometimes to just use the network effect!
     - **Trademark**: Exclusive right to use of name or mark
     - **Copyright**: copying prevented but not reinvention. It is self-declarative and just requires you saying 'Copyright <year> <author>' - lasts 70 years from the death of the author. Fair use covers text only but is not well defined.
   - Summary of plans: (1) Development plans with methodology and milestones, (2) Marketing, (3) Sales and distribution, (4) Quality and industry standards
   - Financials
   - Appendices:
     - Financial Model

  - Key staff
  - Letters of support
  - Correspondence re IPR
  - Full development plan
  - Full marketing and sales plan
  - Examples and brochures
2. Development Plan
3. Project Plan = what doing and when
4. Marketing Plan = how to reach people
5. Sales Plan
6. Quality Plans = how to make sure have made the right thing
7. Financial Projections with budget and cashflow. Idea is that you pay back financing in the third year

2 Money and Tools

2.1 Accounting

Why? They act as a set of instruments on the dashboard of the company. To control, you have to first measure the accounting. It is also a statutory duty to: (1) keep proper books of the accounts, (2) do an annual audit, (3) be solvent
Double Entry: Idea is that you have debits (to receive - left side) and credit (to give - right side) which balance each other out.

Format

1. **Income**:
   (a) Sales
   (b) Interest
   (c) TOTAL Income
2. **Expenditure**
   (a) Cost of Goods (CoG)
   (b) Salaries
   (c) Overheads
   (d) Marketing
   (e) TOTAL Expenditure
   (f) Profit

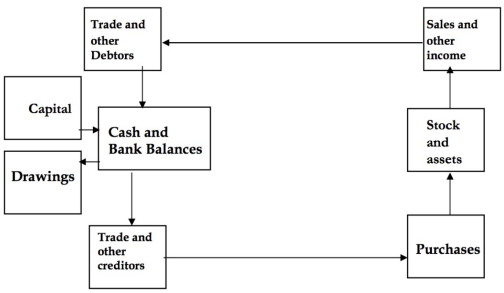
Profit & Loss Account

Debit	Credit
Cost of Goods Sold (all goods for resale minus any stock left at the time)	Sales (invoices raised etc)
Expenses (all the costs including wages)	
Profit (always a balancing figure)	

Balance Sheet

Debit	Credit
Fixed Assets (eg Computer, Car)	Creditors (people you owe money)
Debtors (people who owe you money)	Loans (banks you owe money)
Stock (goods for resale)	Capital (the money you put in)
Bank (assuming a positive balance)	Retained Profit (the profit made so far)

Interlinking of Accounts



Boundaries

1. Entity
2. Periodicity
3. Going concern
4. Quantitative

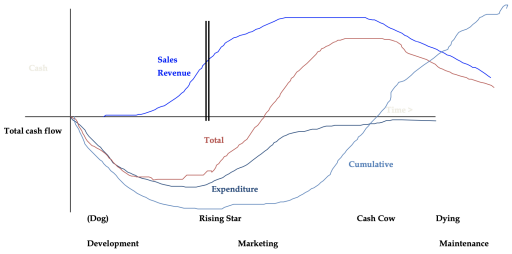
Ethics

1. **Prudence**: Overstate losses, understate profits
2. **Consistent**: use same rules throughout
3. **Objective**: avoid personal preference
4. **Relevance**: true and fair

2.1.1 Tests

1. Current Ratio = Current Assets / Current Liabilities - measures the liquidity and val < 1 indicates potential cash flow problems
2. **Liquidity Ratios**: (1) Current assets, (2) Acid tests
   - **Acid Test - quick health test**: (Current Assets - Stocks) / Liabilities. Shows shorter term liquidity - idea that it takes time to sell stocks
3. **Profitability Ratios**: (1) Return on investment, (2) Gross profit, (3) Net profit, (4) Markup
   - ROI = Profit before tax / shareholders' funds
     Should be 40% for long term sustainable high growth
4. **Investment Ratio**: (1) PE ratio, (2) Gearing, (3) Earnings per share
   - **Gearings** = Net borrowings / shareholders' funds: this shows the reliance on borrowings and hence the vulnerability to interest rate rises
5. **Efficiency Ratios**: (1) Stock turnover, (2) Asset turnover, (3) Debtor collection period, (4) Creditor payment period

2.2 Product Stages



Chasm is when you move from the development company to production company - it is very tough to cross this

2.3 Sources of Finance

1. **Debt**: Loans - repay the same amount regardless of performance
2. **Equity**: give share of the company and return depends on the performance of the company
3. **Convertible debentures**
4. **Redeemable preference shares**
5. Family and friends
6. Crowd Funding

Generally raise money in stages - with 30% dilution at each stage. Do this as different people have different risk appetites. N.B. VC target is 10x return over ten years.

2.4 Company Types

1. Sole Trader
2. Partnership
3. Private Company
4. Ltd Private Company
5. Public limited company (plc) - when you sell shares publicly
6. Listed company

2.5 Stocks, Shares, Futures and Options

2.5.1 Stocks

- Multiple types: ordinary vs preference (appoints directors and gets paid first), voting and dividend rights
- **Buying and Selling**: illegal to advertise unless member of an SRO (or are one). Private companies need board approval to sell shares (and pay stamp duty). Public companies are listed on a public exchange

2.5.2 Options and Futures

- Contracts to buy or sell at a fixed price at some future data - typically 10% change. **Futures** requires the completion whereas the completion is optional for options

2.5.3 Valuation

1. Market value - compare to similar products
2. Utility value - cost to reproduce
3. Asset value
4. Net present value of future profit - calculated using EV and EBITDA
5. Discounted Cash Flow
6. Black-Scholes Model

3 Law

3.1 Setting Up

1. Set up as a legal entity: (1) Register company, directors and shareholders, (2) register for tax, (3) Register as employed, (4) Find pension provider, (5) Register with ICO
2. Get: (1) Solicitor, (2) Agent, (3) Mem and Arts, objectives, share conditions
3. Establish company books: (1) Minute book and initial resolutions, (2) Appointment of Bank, Auditors, insurance, (3) Employee handbook

Need the following:

1. Premises
2. Phone and internet
3. Letterhead
4. Accounts and accounting system
5. Purchasing system
6. Asset control
7. Insurance
8. Recruitment
9. Furniture and Equipment

3.2 Duties of Directors - appointed by shareholders

1. Ensure solvency
2. Maintain fiduciary duty to shareholders
3. Ensure business complies with all applicable laws

3.3 Control

- 25% + blocks substantive resolutions
- 50% + = day to day control
- 75% + = absolute control

3.4 Internet Issues

- Legality of encryption
- Definition of fair use
- Signatures of contracts (jurisdiction, audit trails and liabilities)

3.5 Tort

Avoiding infringements of the rights of others and giving adequate notice to others of your rights that you want to enforce. i.e. if you infringe other rights you can't enforce your own rights

1. Defamation
2. Negligence
3. Copyright
4. Trademarks
5. Patents

4 People Organisation

US	*UK*	
Chair	Chair	Senior figure; Old wise head Experience and contacts; Major dispute resolution; part-time
CEO	Managing Director	Finding money; Investor relations; Style setting; Keeping the peace
CFO	Finance Director	Accounts etc. Office management; Administration, Legals, Quality control
CTO	Technical Director	Inventing new things; development
COO	Production Director	Running the factory and distribution
VP Marketing	Marketing Director	Deciding what and how to sell; pricing Marcoms; Market information
VP Sales	Sales Director	Selling; CRM;

4.1 Management

They set the lead for the culture and sets all the goals that the entire team is attempting to achieve. They have to be accountable for the decisions they make. **Two Pizza Rule**: don't have meeting that couldn't be fed by two pizzas. Growth break points are: 7, 50, 350.

The **classical** model is where tasks are reduced to simple elements which are boring and repetitive - when individuals are primarily motivated by money! In this Foyolism model, there are the following tasks: (1) Planning, (2) Organisation, (3) Staffing, (4) Direction, (5) Co-ordination, (6) Controlling. Taylor talks about how you select, train and develop each employee providing detailed instruction and supervision rather than letting them train themselves. Management methods include things like Gantt charts and task and bonus systems.

4.2 Human Relations

Important to remember that humans are the key asset and hence must consider individuals social needs, motivations, behaviour, etc. McGregor proposed two possibilities:

- **Theory X**: **authority, direction and control**. Idea is that people have to be made to work with hierarchichal structure, defined roles, little flexibility. This is generally for traditional industries
- **Theory Y**: **integration, self-control**: People want to work but are prevented from doing so - will exercise self-control when committed to common objectives, accepting responsibility for their actions. Plays well with a flat management structure. Used for most modern technology companies.

4.3 Teams

Teams should be large small - seven. They have: (1) definable membership, (2) shared identity, (3) shared purpose, (4) interdependence, (5) interaction. Belbin proposed a number of team roles - everyone should be given a role. Tuckman proposed the following stages of formation:

1. Forming
2. Storming
3. Norming
4. Performing

Weinberg talks about how to do egoless work by creating a culture to minimise personal factors so quality of work can be improved with: (1) open communication, (2) objective feedback, (3) asking for help to be encouraged. Important to say Dunbar's number is 100-250 which defines the number of relationships in which an individual knows who each person is and how each person related to every other person. If people don't connect, leads to: (1) intergroup hostility, (2) inward thinking, (3) NIH syndrome

4.3.1 Hiring and Firing

Logistics

- When hiring, need to create an employment contract that defines: (1) hours and holidays, (2) remuneration, (3) grievance procedure. Important to be aware of the need for non-discrimination according to the Equalities Act 2010.
- When firing: 2 verbal and 2 written warnings. Can offer redundancy instead or have a settlement agreement

Recruiting:

- Define the role carefully: (1) define work, (2) define work, (3) define personal characteristics
- Use personal contacts
- Referrals
- Advertisements
- Agencies
- **Conducting Interviews**
  - Purpose is to (1) learn about person, (2) compare with job spec, (3) provide information about organisation and role, (4) encourage positive feelings about role
  - **Preparation is important** - need to be aware of who is involved, where it is happening, how to get reports from interviewers.
  - **Issues with conducting interviews**
    1. Pre-conceived ideas
    2. Only remembering last candidate
    3. Eye conduct
    4. Projection
    5. Leading questions

    It's important to create a rapport, listening rather than talking

    Questions: have multiple types of questions, with differing (1) pace, (2) open / closed, (3) situations, (4) probing vs relaxed, (5) relaxed vs stressful

    At the end, check the plan and explain the next stage.
  - How to make a decision

    1. Skills
    2. Personal qualities
    3. Best compared to the rest
    4. CVs, references, etc

- **Doing interviews**: Opportunity to sell yourself and learn about company, role, etc. Not more than three major points in an answer.

4.4 Appraisals

Why? Enable members to get clear idea of how they are doing and where they may need support or training. Can also be used for setting objectives both from the employers and employees' point of view.

Form:

1. Date, Name, Job title, Assessor
2. Self assessment
3. Assessor or line management assessment
4. Key objectives
5. Development plan
6. Jointly agreed actions
7. Follow up

5 Project Planning and Management

5.1 Role of a manager

1. Direct resources for achievement of goals
2. Provide vision and inspiration

Managers can range on a line from authoritarian to democratic and in between the two.

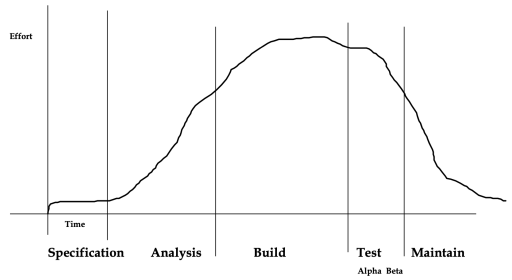
Qualities

1. Technical and organisational knowledge
2. Ability to grasp situations
3. Ability to make decisions
4. Ability to manage change
5. Creativity
6. Mental flexibility
7. Experience
8. Pro-active
9. Moral courage
10. Resilience
11. Social Skills

5.2 Project Management Variable

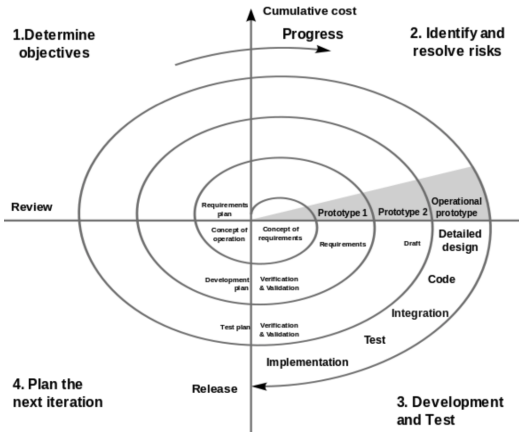
Resource, Time and Function: can have any two but not all three

Development Cycle



Approaches and Methodologies

1. **Top Down**: waterfall decomposition
2. **Bottom Up**
3. **Rapid Prototype**: (1) Successive refinement, (2) agile engineering
   - Agile defined in 2001 - manifesto was published
   - A number of agile software development frameworks were then created including Kanban, Scrum, etc
   - Packlog -> Sprint Backlog -> Sprint -> Working increment of software
4. **Middle through**
5. **Spiral Methodology**



5.3 Scrum Meetings

Consist of:

1. Daily Scrum
2. Scrum of scrums
3. Script planning meetings
4. Script review meetings
5. Sprint retrospective

Can use PERT and GANTT charts to visually represent a project and its progress. Allows for critical path analysis which allows us to compute the earliest and latest start / finish for each task. The difference is the slack. Critical path joins the tasks for which there is no slack - where any delays in tasks on Critical Path affects the whole project.

Levelling

- Adjust tasks to match resources available
- Automatic system is available but not always giving optimum result
- Tasks delayed within slack without affecting project dates
- Adding resource to late project can cause **Recursive Collapse** (additional learning delays and overheads)

Estimation Techniques

1. Experience
2. Comparison with similar tasks - 20 lines of code / day, 20 working days per month (but 200 a year)
3. Decomposition
4. **Rules of thumb**
   - For software projects, estimate 10x cost and 3x time
   - 1/3/10 rule: 1 for prototype, 3 for creating project, 10 for sales and marketing
   - **Hartree's Law**: Time for completion is a constant regardless of the state of the project - project is 90% complete 90% of the time
   - 80% rule - don't plan to use more than 80% of available resource

6 Quality, Maintenance and Documentation

6.1 Productisation

1. Does product work on all target systems? Hardware variants and OS variants
2. Internationalisation
3. Testing: usability, markets and standards approvals
4. Documentation
5. Legals: IPR, licence, liability
6. Packaging
7. Manufacture
8. Marketing Materials
9. Maintenance and after sale support

Supply Side Management

1. **Quality Control**: monitoring and contingency planning
2. **Information Systems**: stock control, JiT shipping, supplier integration
3. **Reliability of Supply**: multiple sources
4. **Change management**: evolution, tracking and support

Scale Up takes lots of time and money. In particular to reach new markets, there are a number of issues with (1) regulation, (2) translation, (3) adaption, (4) high volume manufacturing. It also takes time to hire staff and acquire materials.

6.2 Plans for quality

It's highly important and is hard to add later and is cheaper in the long run. It requires board-level function. Part of this is following standards which need to be clearly defined:

1. ISO 9000 / BS 5750: Quality management systems and trace-ability
2. BS 7799: Information Management and Security
3. **Internal Standards**
4. Coding standards (naming, structure, testing)
5. Documentation standards

Also important to record and audit all key decisions and documents.

6.2.1 Key Documents

1. **Project Definition**: (1) User Requirements Document, (2) Project Constraints Document
2. **Base Definition**: (1) Functional Spec or prototype, (2) Top Level Design
3. **Control**: (1) Project Plan, (2) Project Log, (3) Quality Plan, (4) Document Plan
4. Detailed Controlled Documents: (1) Sub-system specs and interfaces, (2) Data model and dictionary, (3) Module specs and interface, (4) Released code and documentation

Part of how you maintain quality is by **monitoring** so you have time to do something about it. A lot of this comes down to culture of the company allowing for communications both internal and external. It is also important to have milestones and weekly meetings. However, it is important to keep these meetings short (circulating the agenda and papers before).

Brain-storming: method for problem solving that can fix issues with otherwise unseen issues. Should vote on all ideas and work on top few

6.3 Board Meetings

Where decisions are made rather than having discussions. Agenda looks like:

- Call to order: (1) attendance, (2) minutes, (3) matters arising
- Statutory Business
- Reports: (1) Finance, (2) Business Development, (3) Personnel, (4) Shareholder's Issues
- AOB
- Date of next meeting

Important to be aware of: **S**trengths, **W**eaknesses, **O**pportunities, **T**hreats

6.4 Testing

Need to make a test plan running a test suite testing:

1. Base functionality
2. Specific Bugs
3. Performance
4. Correct failure

Should also have a bug reporting system (with history) - with action plan for fixes and prioritisation

6.5 Plan for maintenance

Important to keep the relationship with clients going, with a revenue stream for maintenance and for future sales. Can run a help desk, publish documentation, etc.

6.6 Plan for documentation

Requires ten times the coding effort and is a specialist skill. There are levels of documents: (1) user, (2) training, (3) system, (4) maintenance. It is important to have a documentation standard

7 Marketing and Selling

Sales = moving product, Marketing = what to sell, to who and how

7.1 Marketing

- Look at product characteristics and price sensitivity to attempt to get the product to people.
  Market Characteristics are: (1) size, (2) sustainability, (3) defensible
- Market using multiple marketing channels, informing marketing routes

ACCTO: Criteria for customer acceptance (80% of new produce failures due to customer acceptance)

- A - relative advantage over competitors
- C - complexity
- C - compatibility
- T - trial-ability
- O - observability

Produce a market requirement document with:

1. User Profile
2. Product Description
3. Customer Profile
4. Competitive Analysis: what are table stakes and what are USPs
5. Positioning: thought that customers have when they hear the product name
6. Market Trends
7. Market Size
8. Route to market
9. Pricing
10. Customer Support
11. Business Opportunity
12. Alliances and Partners
13. Marcoms - telling market about the produce

Sell a product though its (1) features, (2) advantages, (3) benefits

7.2 Product or Service Requirements

Customers need to:

1. Know about it
2. Have opportunity to purchase it
3. Have means to purchase it
4. Be satisfied that it meets a real need

7.2.1 Market Analysis

- Desk Research: (1) existing market and solutions, (2) competition (3) demographics
  Discover Market from Bottom Up
  1. Understand problem
  2. Define solution
  3. Validate qualitatively
  4. Verify quantitatively
- Market Surveys: (1) Qualitative, (2) Quantitative
- Distribution channels
  - Direct sales
    - Bespoke - requires sales staff
    - Multiple mail order requirements in terms of staff and assets
  - Distributor / retailer
- Market communications

- Targeting
- Advertising
- PR
- Direct mail

7.2.2 Pricing Models

1. Market comparison - order of magnitude better or cheaper
2. Utility
3. Cost + Profit
4. Loss leader

7.3 Sales

Main technique: Listen to the customer's needs, concerns and authority

Stages:

1. **Prospecting**: locating the most likely buyers through (1) cold calling and (2) qualified prospects using marketing responses, exhibitions, lookalike audiences. Likely to get 10% result in sale - 2 calls per day
2. **Pre-approach**
   - **Research**: (1) Who are decision makers? What is management structure? What are their concerns?
   - **Preparation**: (1) Presentation, (2) Cards, brochures, etc
3. **Approach**: Contact building
4. **Survey**: Find out what they need, what their constraints are, what the budget is. Also find the right person to contact, their structure for purchasing timescale, etc
5. **Proposal**: Sell the benefits to the customer, consisting of:
   - Introduction
   - Objectives
   - Recommendations
   - Benefits
   - Financial Justification
   - Warranty and service
   - Company Background
   - Price and conditions
6. **Demonstration**: need to be well prepared with all of the demonstration planned out
7. **Close**: be aware of customers' hidden agenda and perhaps offer a discount or limited offer
8. **Service**: Manage relationships with regular liaison and good communications

7.4 Planning and Records

1. Graded Prospect List - keep a good list of all the important information:
   (a) Company name
   (b) Address
   (c) Phone
   (d) Fax
   (e) Contact name
   (f) Decision maker
   (g) Potential %
   (h) Previous contact: date, who, action
   (i) Next contact: date, who, action
2. Sales Forecast: company, amount, time analysis, product analysis, comments
3. Call analysis
4. Sales cost analysis

7.5 Control and Commissions

Control: Structure sales organisation structure by product, geography, channel, key account
Measurement: (1) Cost per sale, (2) Response rate, (3) Timeliness, (4) Individual measures, targets
Commission: Don't stint, instead pay basic salary, pay on delivery or payment

8 Growth and Exit Routes

8.1 New Markets

Can grow horizontally (similar products or services with new customers - different geography, applications, pricing) or vertically (new products for similar customers)

Problems of Growth:

1. **Communications**: needs a conscious effort
   - Formal channels
   - Charters
   - Newsletters
   - Company meetings and informal events
2. **Control and Monitoring**
3. **Structural Change**: need to develop good management structures
   Have a set of groups and sub-groups, charters and reporting structures
4. **Formalisation**
5. **Cash**
6. **Second system effects**

8.2 Exit Routes

1. Acquisition - natural process, can either be forced sale or wildflower model. Then leads to a number of stages after this occurs starting with selling the company and ending with working with the new parent company
2. Flotation - normally just for raising capital when company is worth £10m+
3. Management buy out - much easier to fund compared to flotation. Also allows for introduction of new blood to a mature company
4. Liquidation - can be voluntary to compulsory

8.2.1 Valuation

1. Asset value
2. NPV of profitability
3. DCF
4. Utility
5. Comparison with similar
6. Market value
7. Probabilistic methods - matrix, black scholes
8. Paper vs Cash
9. Lock-in periods

8.2.2 Managing Traumatic Change - Kubler-Ross Model

Four stages when dealing with the change: (1) Denial, (2) Anger, (3) Resignation, (4) Acceptance