The WRTI Book of Practical Inventing

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Foreword

Innovation – the path to economic progress by Professor Steve Dixon, Warwick Ventures Enterprise Champion, Warwick University

Innovation can mean different things to different people, but for me, is the process by which new products and services are developed. Innovation is the fuel for prosperity in any economy and a driver for socio-economic benefits. Innovation clearly must be supported, but how? It is important to support new ideas developed in both industry and academia, in areas key to the national economy. Research is important and underpins innovation, and it should be related to an international theme in today's global economy, and can have shorter or longer term routes to market. Researchers need to think internationally from the outset and to be aware that you cannot always find the most suitable industrial partners within your own country.

Links need to be developed between the scientific, engineering and manufacturing industries to universities and their research teams, with non-geographic clusters of specialist manufacturers around universities whose research programmes are focused upon certain key technologies. Universities are increasingly playing an important role in international cluster activities – and not always as facilitators but also as contributors, and the clusters have commercialisation skills that the universities do not always possess. Furthermore, science parks, often attached to universities and supporting start-ups, are becoming more important, supporting spin-offs and offer many great services for new ventures, helping to plug the gap left by the closure of the regional development agencies.

Manufacturers developing products based on complex technologies should invest in fully automated processes, removing the labour element from the product-cost equation. A fully-costed product is normally based on the equation: cost = materials + overhead + labour. If labour is removed from this equation through investment in automation and continuous manufacture, and if global marketing ensures a high volume throughput which "absorbs" the overhead, in accountancy terms, which also drives the purchased costs of materials to the minimum, then that organisation can compete with products made anywhere in the world, and will not be threatened by low labour-cost competitors in developing economies. In addition, there is also value added through quality and know-how and benefits for innovative manufacture to remain close to home.

But, to get back to the starting point, universities themselves can never possess a monopoly on the development of ideas for research. Ideas for innovative products and services are usually industry driven and are derived from problems and frustrations with the status quo in the world at large. That means that the greatest number of such ideas must potentially be present in society external to the universities, ideas which the universities should foster and develop further in co-operation with their inventors, a concept which I fully support.

As with so many things, there is no unique solution to successful innovation, and any guide on innovation should be seen as just that – a set of experience led thoughts and ideas, that requires a flexible and adaptive approach in implementation, which should not be thought of as simply a recipe. And so I wish success to the Wessex Round Table of Inventors and to their sponsors in Southampton Solent University. Your model of co-operation is one which should be emulated more widely, and which I am sure will bring successful new commercial ventures into being.

The WRTI wishes to acknowledge their pleasure at the inclusion of illustrations into this book by Ms Charlotte Milner, Artist and Illustrator.

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INNOVATION IN ACTION

WRTI is formed by and for inventors, innovators and entrepreneurs – whether lone beginners or experienced professionals. The club acts as a catalyst for ideas and a forum for like-minded individuals to meet and share views. WRTI also serves to stimulate, encourage and promote the development of members' innovative new concepts and/or products.

WRTI meets on the second Wednesday of every month except August, normally at Southampton Solent University. Networking with refreshments is available from 18.00, with the meeting itself starting at 18.30. From time-to-time, meetings are held off-site and /or at other times in locations of interest to inventors. We aim to cover the whole range of topics relevant to the invention process, from having the initial idea and developing it, to obtaining intellectual property, formulating business plans, marketing ideas, licensing, etc. Invited speakers describe their areas of expertise, and members share their experiences.

Do you have a really good, original idea?
Then the Wessex Round Table of Inventors is for YOU!

To join the WRTI – please see: http://www.wrti.org.uk/join

1 Developing Ideas – the thinking process

This subject is the "golden thread" that runs through all the chapters of this book. It is not just about the germination of inventive ideas but also the processes of refinement and continuation through all the following stages necessary to bring the idea to a commercial realisation.

The Development of Ideas
Assembling the information and knowledge the inventor has already
by John Gibbs, WRTI Member

Inventors are supposed to dream up original ideas, new ways of solving problems.

'Dreaming up ideas'

But is this really what is going on? Up to a point, of course, it is but perhaps the real trick lies in the ability to re-assemble the information and knowledge that the inventor already has in a fresh combination.

The process of inventing nearly always starts from the need to solve a problem. Necessity being the mother of invention is no idle statement; so most inventions start from thoughts such as; there must be a better way of doing that, how could that be done more simply, more cheaply, better, quicker, made lighter? Etc.

When an inventive mind has started on this track – and it does seem to be the case that not everyone has this particular gift – the process of sifting, sorting, re-assembling, often starts as an unconscious process. However it is also possible to direct the mind to work actively on the problem.

The unconscious invention is a surprising thing. Suddenly a solution arises apparently unbidden. Now why didn't I think of that before, or why has no-one else thought of that before? (Unfortunately someone very often has). The idea just pops out. Sleeping with a problem on the mind appears to be a powerful method of harnessing this unconscious capability. Many of us have woken to find that the solution is evident or at least the problem is suddenly able to be viewed in a new way.

The business of conscious effort to solve a problem is quite different. One can start by assembling all the relevant data about what needs doing, especially by really working on defining the problem. It is not unusual to find that the problem is not really what one first thought at all; maybe there is an entirely different approach to reaching the objective and maybe it is a great deal simpler that way.

Many great ideas have emerged from observing what the natural world has come up with which might show the way forward – evolution has had plenty of time to solve problems after all. Velcro is of course the obvious example with the annoying habit of seeds clinging to clothing being the inspiration.

So the inventor might reach the stage when he thinks – Ah! That's a brilliant idea! and he works at sketching it out and refining it. But in the morning a new truth may well dawn. Has the idea stood the test of a bit of overnight reflection? New snags and difficulties may well become apparent. This is typical in my experience and only new ideas that still seem worthwhile after mature reflection are worth pursuing.

Getting the germ of the idea down on paper as soon as possible works for me and I like to keep all the sketches which show how the invention has developed. Also these can be important later in establishing ownership of the invention. The ability to think and sketch, ideally in three dimensions, is a significant advantage and I can more easily refine the idea once I have something tangible to work on.

I find that I normally have a need to bounce the idea off someone else to see if it stands up to evaluation by one who is not prejudiced by the inevitable pride of ownership and can therefore assess the invention more critically. Of course there is a danger of doing this if one is concerned about protecting the idea at a later date but here an inventors club can help, since there should be a non-disclosure undertaking in place.

The nature of developing an idea is nearly always a cyclical process but eventually one feels that the development has progressed to the point of maturity and the next stage in the invention process such as producing a prototype can begin. However, invariably a hard road lies ahead!

The Development of Ideas – the thinking process

by Tim Pateman, WRTI Member

This subject is the golden thread – you've had one idea, why not have some more?

"If I had asked people what they wanted, they would have said faster horses" – Henry Ford

I rarely get to a large supermarket, so when I do go, I like to browse. The other week, I came across packets of cubes of frozen herbs. A simple product, each cube can be used like fresh herbs, and is equivalent to a teaspoon. At first I was annoyed that someone had got one of my ideas (no XXX) to market; but then I realised I would have done it better. I would have got David Suchet to advertise the product, and I would have called it herb-cube Poriot. I love seeing my ideas being done by other people, and I think that attitude is what helps me create ideas in the first place.

I could go further – the only reason that I enjoy inventing is that I do it in a state of splendid isolation from comments such as 'it's already been done'. Keeping those first precious thoughts shielded from negative comments from yourselves and others is, I would argue, absolutely critical to letting ideas flower.

'Let ideas flower'

The 'it's probably already been done' remark is definitely one of the most common responses to any idea I moot to anyone. This is like responding to a poet that someone has most likely already used those words or expressed the same sentiment. The vast majority of product ideas are only new in a small, detailed sense and might even not work or be profitable.

Overcoming negativity and giving an idea the time to form may be important, but what about the very first part of the process, having ideas? This is a deeply personal process, and as someone who takes a scattergun approach to having ideas for products and innovations, I may be untypical of other inventors. All the same, I think that at some point a few years ago, when trying to focus my hung-over brain for a long drive, my thought processes changed, and I started listening to the flow of ideas that had probably always been there. From seeing other people talk about their ideas in a joking way, I assume that coming up with innovations is a nearly universal trait. The question is perhaps how to access what's already going on in the brain, rather than trying to do something wholly new.

There are a number of innovation systems – processes that aim to get ideas flowing, such as TRIZ. Having had no personal experience of these, I can't say whether these systems seem to be genuinely productive, or whether they work because simply having the time, space, and inclination to develop ideas is enough to trigger thoughts. They may be worth looking into. I suspect that many of them are more formalised versions of what inventors tend to do instinctively. Formalising something creative can be a good way to kill it, so perhaps a good approach to having ideas is to start informally, loosely, and in as unfocussed a way as possible, before trying a more regimented system.

Plenty of ideas must be born out of pure fantasy – someone wishing they could do something that they can't currently. Perhaps this is the thought process that all but the most unquestioning people experience regularly – something between aspiration and frustration. I don't always agree that an innovation needs to solve a defined problem, but perhaps defined problems do lead to a large number of decent ideas.

Symmetry approach

The final process that I assume is fairly common is switching off – simply letting the semi-conscious mind loosely associate thoughts and make connections that wouldn't have been made otherwise. A large number of my ideas occur to me when I'm falling asleep. This is the main reason that I have about half a dozen ideas for new types of clock! However, I rarely remember my ideas the next morning. Only a stack of post-it-notes and a random scattering of pens enables me to capture these particular possibilities, even if many of them turn out to be nonsense.

To sum up, writing ideas down and not crushing them with practicalities for as long as possible are the two things I've changed about the way I behaved that have turned me into an ideas person. I strongly advocate firstly keeping a note of ideas in a single place where you can browse through them, and secondly accumulating as many as possible.

The very fact that I have hundreds of ideas, but don't intend to take any one of them to market at the moment puzzles people. I simply find it enjoyable to collect ideas – to take the natural curiosity and playfulness of the mind and capture what comes out. I would also argue that being a 'collector' of ideas, rather than someone who has a few ideas but pushes them a lot further, has one big advantage. When I first started having ideas the thought of sitting on them and not taking them to market was driving me insane. I almost felt guilty for not following the accepted path of stumbling across an idea, and therefore dedicating all my resources to getting it to market. Now I have a different perspective on my ideas – literally only one or two stand out as things that I might want to pursue. Everyone has ideas, and I'd implore everyone to stack these ideas up before running with one particular innovation.

2 Validating the business potential – will it sell?

This is a step for which it is usually necessary to seek help from independent (unemotionally-involved) third parties. If the idea does not have a strong, robust commercial future – then it becomes more of a hobby and less of an invention.

Will it Sell? – unemotional testing
by Mike Overy, WRTI member

Before investing significant time and/or money on pursuing a new invention, it is worth considering if it will sell in sufficient quantities and at a sufficient profit, in other words is there a worthwhile 'business case'?

This is often a step left until after significant time and money has been spent, only to find that there is insufficient demand for the particular product. One of the most glaring examples of this, was the 'Sinclair C5' personal transportation device, which failed spectacularly in the market.

Fashion and 'fad' products are notoriously difficult to predict the market for, as they rely on gaining traction in the market. Who for instance could have predicted the popularity of the 'Slinky' or the 'Rubik Cube'? Such products often rely on gut determination. A proportion of such products will succeed, but many will fail, so to stand a good chance of success usually requires a succession of products, with limited investment in each until its success is established.

For inventions which solve a known specific problem, their benefits can and should be quantified: better, faster, cheaper, etc. It is then possible and desirable to conduct basic market testing, before committing to significant expenditure. A dummy brochure, dummy product or other sales aids can be produced and potential customers asked for their opinions on the concept, pricing, requirements, etc. As well as establishing the need, this can often help refine the concept before committing to expensive development, tooling, production costs, etc.

Where aspects of the product remain secret, it is still possible to get market feedback without disclosing these aspects, by instead focussing on the benefits, in other words treat any secret technology as a so called 'black box'. For example the Dyson vacuum cleaner could have been described as a 'high performance bagless vacuum cleaner', without disclosing the underlying core cyclonic technology.

Conducting focus groups and other forms of market testing may be an inexact science and best done by professionals, however with some homework and good preparation, most articulate and outgoing people should be able to gain valuable insights on a proposed product concept. A simple comparison wih existing/competing solutions can be used to highlight the benefits.

If and when the product does go on sale, further market testing should be carried out and customer feedback obtained, to refine the whole concept further.

Recommended reading:

'Will it Sell? How to determine if your invention is profitably marketable' by James E White [www.willitsell.com].

The Business Potential? – developing robust data

by Alan Finn, WRTI member

An invention is usually either an idea which is completely new and patentable or is a significant modification of an existing idea which possesses strong and defensible Intellectual Property Rights (IPR). Either way, there may be no relevant, existing, published market research available in the public domain or any which can be readily purchased. Therefore data on the commercial potential in the marketplace of your invention has to be gained by other means.

The golden rule is never to make a "disclosure" before your patent application has been filed. That is, never inform anyone directly or through the media about your idea, verbally or in writing, without protection. That constitutes a disclosure and could invalidate any patent application you may make subsequently, thus allowing another to develop your idea and to take it to market first. This makes it hard to gather data on the potential commercial viability of your idea.

However, approaches can be made to people, knowledgeable in the field in which your invention will exist, under a "Non Disclosure Agreement" (NDA). Templates of NDAs exist for free download on the Internet and you may wish to get advice on them from an appropriate legal expert. However, be aware that, although an NDA signed by another will prevent an accusation of "disclosure", if someone else does develop your idea into a commercial product, even under NDA, the protection offered by the NDA must be enforced by legal action and a court of law. In other words, you must take the offender to court which can be very costly, so choose those from whom you seek an opinion on your invention with great care.

So – how can you get a level of confidence in the commercial viability of your invention – and should you even bother? A lot of people don't bother, seeming to prefer the thrill of the gamble and Russian roulette. The very first step is a Patent Search which may initially be done by the inventor on the Internet. But that should only be a first step which must not end there. Many inventors get unstuck at this point, thinking "I have worked in this field (the field in which the invention lies) for many years and have never heard of any other idea like it – and the Internet can't find anything either!" And so they file and begin the ultimately expensive patent journey, only later finding that they have infringed someone else's patent and wasted much time and money. Patent searching is best done by experts, even when the inventor is quite convinced his idea is unique. It is a critical, initial investment and the search report will ultimately prove to be a very valuable document when you are ready to try to attract potential investors to help you take the invention to market.

Assuming then that the inventor has obtained robust results from a patent search conducted meticulously by a professional in the field (see Chapter 3) and that no "prior art" has been turned up in the search report of another or very similar, close invention, then that is good evidence that you have no competition in that field. However, that is not the same as evidence of potential commercial success. That is best obtained from those close to the market of potential customers but whose business is in retailing and not in engineering or manufacturing. Search out senior people in the marketing departments of relevant retailers e.g. specialist pharmaceutical or medical product retailers (these specialists can be found in directories which can be purchased, electrical retailers such as Maplin, on-line retailers of general products using catalogues, etc…. Find those senior people with a motive to assist new product development, products which they can sell in the future, and set up qualitative market research panels or focus groups with them. They may negotiate some initial exclusivity which is acceptable to the inventor. But only carry out this exercise under signed and witnessed NDA.

The same process of investigation under NDA can be carried out in other fields in which retailing is irrelevant, e.g. medical products to be sold to the NHS, military products to be purchased by the MoD or specialist products which form adjuncts to the aeronautical, automotive or shipbuilding industries. Don't skimp on market research in an effort to get to the market quickly. This work can be done relatively cheaply by the individual inventor and will repay the effort many times over.

Invention Assessment

How you should and others may assess your invention

by Mike Overy, WRTI member

Assumptions:

The invention is likely to be some sort of product or service, consumer, industrial or in a supply chain. Traditionally, it was most likely to be hardware but, increasingly, it is likely to be a software or 'virtual' product or application.

Will it work?

You should ask yourself, does a prototype exist? Has it been tested and by whom? What is the nature of the prototype? Is it to prove the principle of operation, is it a bench prototype, a pre-production single unit or a pre-production batch? Has it been evaluated by one or more potential customers? Has any value engineering been carried out? Has it been tested in the environment in which it will be used? Have the details of manufacturing been worked out? Does this development depend on any key product or service outside your control? If no prototype exists, what evidence is there that the product will work effectively, are there any drawings, is there some theoretical analysis or computer simulation? What Intellectual Property exists or could exist?

Will it work well?

What evidence is there that the product will be reliable? What are the weak points? Have you applied a Failure Mode and Effects Analysis (FMEA)? Will the product be of high quality (a higher specification) compared with competitive devices? Will customers require you to have ISO 9000 and/or other registrations? Who will be responsible for its quality assurance – a qualified person?

Why is it better than the alternatives?

What are the nearest competitive products and who produces them? (Large or small companies, imports, well established, dominant suppliers?) What is your Unique Selling Proposition? (USP – your single most important advancement or improvement). What is your overall competitive advantage? (Cost, function, size, appearance, range of applications, etc.?)

How does it satisfy a sector of the market?

What problem does it solve? What does the target market sector use at present? Why will they change to your solution? Will your customer have to rely on you? What is the risk to the customer?

Is it cost effective?

What is the business model? How much would it cost in the anticipated volumes? What are the routes to market? How much would it cost to distribute? What are the distribution margins? How much would it sell for to end users in the anticipated volumes? What are the marketing costs? What are the warranty costs?

Timeliness?

Has there been a recent change or new development which makes the product especially attractive to users? (New powerful phones/computers, new chips, associated new products, recent government legislation or EU directives, new industry standards or trends….?) Is the market ready for the product? (Could it be premature or too late?). Can you launch the product quickly enough to catch the market?

Longevity?

Could the product become obsolete quickly? What is the usable lifetime of the product? Will there be repeat business? (In terms of replacements, for servicing…?). Is there a fashion or fad element?

Does it fit into a future family of products?

Is there enough potential business for this product alone? (Could it saturate the market or could there be marketing problems?). Is it reasonable to build a business on one product because distributors may not open an account for one (low priced) product? What is the potential for added-value to this product line? (Could you introduce accessories, larger or smaller units, lightweight or heavy-duty variants, etc.?).

Previous record of technical innovation?

Are there any previously-launched and successful products? Do you have any previous experience in the disciplines of manufacturing, in R&D engineering, in product design, in marketing, in Quality Assurance? What areas of required expertise are missing? **Quantitative Assessment (score 1–10 in each category according to description):**

- **Will it work?**
  1 Idea only, little evidence of practicality or manufacturability.
  3 Prototype exists, principles established, internal evaluation only.
  5 Manufacturing well advanced but no customers yet.
  7 Recently launched, early reports from customers good.
  10 Established product, satisfied customers, good order book.

- **USP**
  1 No innovation, other factors contribute to viability.
  3 Some distinct improvements over existing products.
  5 Innovative but no IPR yet (or possible), could be difficult to convert customers.
  7 Obviously innovative, limited IPR, easily appreciated advantages to customer.
  10 Very innovative, good IPR coverage, satisfies a well-known market need.

- **How does it satisfy a market sector?**
  1 No specific market sector has yet been identified.
  3 Preliminary investigations indicate that there is potential customer base but quantification is not yet possible.
  5 The market sector can be defined in general terms, encouraging feedback from customers.
  7 Clear market demand exists and you can demonstrate customer product satisfaction, e.g. test marketing of prototypes.
  10 There is a strong demand from a well-defined sector of the market. The product can be demonstrated to meet the requirements of customers fully.

- **Timeliness?**
  - 1 (a) The product anticipates a demand but customers are not yet buying such products since they are not aware of availability or benefits.
  - 1 (b) The market is already supplied with many products of the type proposed & shows signs of saturation or decline.
  - 3(a) Some customers are seeking and purchasing such products but an expanding customer base is not yet proven.
  - 3(b) There are alternative established products and establishing a new product may be difficult. Not strongly differentiated from existing products.
  - 5 There is some discernable activity in the area of the innovation indicating potential but the evidence is not yet firm.
  - 7 There is definite growth in the area of the innovation which will support establishment of a new product.
  - 10 Recent developments/ innovations which support the product show strong growth curves. The product fits closely in this scenario and would be expected to benefit from this growth.

- **Longevity of product or product line**
  - 1 Only one purchase per customer likely for the product. Could be a fashion or a fad for a limited time period.
  - 5 The market for the product exists but not necessarily firm. Variable demand. Success depends on whether this market becomes more stable.
  - 10 Similar products satisfying this market sector have been established for a period of years and will definitely be required for the foreseeable future. Once established the product may lead to repeat purchases.

- **Does it fit into a family of products to permit company establishment/ development?**
  - 1 Product is a single member of what would normally be regarded as a product group – eg special drawing instrument, office product, injection moulded product. Would need complementary products to gain a foothold in the market but not viable as a single item.
  - 5 Viability as a single product is questionable. Difficult to see how modest profits could lead to successful business growth.
  - 10 A viable business can be built on a single product initially. Further added value, complementary items envisaged for future growth.

- **Previous record of technical innovation**
  - 1 No previous successful product. Background of applicant(s) does not provide confidence that knowledge is state-of-the-art.
  - 5 Some evidence of successful innovation but not necessarily a financial success. Applicant(s) provide confidence that technical expertise exists.
  - 10 Strong record of innovation from more than one product – as business venture or as part of a larger organisation (spin-off). Applicant(s) very knowledgeable about the area of development.

- **Intellectual Property Rights**
  - 1 No patent possible (e.g. published information). None proposed. Unpatentable.
  - 3 Provisional patent only. Patent possible (unpublished). Limited coverage.
  - 5 Full patents applied for but not yet granted. Coverage in appropriate market areas.
  - 7 Apparently strong patent position, although could be contested.
  - 10 Full patents granted with good coverage. Potential licensing revenue / damages.

Summary

The individual and overall scores offer indications as to whether it is worth pursuing a particular invention and if so, which aspects are weakest/need further work.

You should ask yourself:

- Will it work? How well? Why is it better than the alternatives? USP?
- How does it satisfy a market sector? Timeliness? Longevity? Can there be repeat business?
- Does it fit into a future family of products? What value can be added?
- Is there a previous record of technical innovation? Are there any potential IPRs?

3 Searching – for prior art & conducting research

This is often forgotten in the rush to patent an idea – or ignored by inventors believing that "this idea is better than sliced bread – it'll sell in millions and there can't possibly be anything else quite like it!" Oh yeah? If someone else's idea is close, missing out this step could cost you your patent protection.

Patent Searching? – keep it simple, but thorough
by Gary Townley of the UK's Intellectual Property Office

You'll probably be surprised how many inventions already exist, even though you have never seen or heard of them. Of the millions of patent applications filed around the world every year, many fail to be granted because something similar or identical already exists.

So, if you have invented something, the first step towards trying to protect it, is to carry out an exploratory search to see if it has been done or thought of before. You can start by looking through any relevant literature such as trade or specialist magazines and by using search engines and websites on the Internet. If you can't find anything that is similar to your invention, you may then consider searching through patent documents using online databases such as "esp@cenet".

Esp@cenet, pronounced 'espacenet', is a free patent search service developed by the European Patent Office (EPO). It provides access to the UK patents database and those of over 20 European patent offices, the EPO and the World Intellectual Property Office.

Reading a patent specification can be confusing, mystifying and even daunting but all specifications, no matter the country of origin have the same aim and follow roughly the same format. A patent specification is a legal document which incorporates all the technical subject matter of an invention which includes:

- A description of the invention – allowing others to see how it works and how it could be made.
- Drawings to illustrate the description.
- An abstract – a summary of the invention that includes all the important technical aspects.
- Claims – precise legal statements in the form of single sentences that define the distinctive technical features.

The specification begins with a title which can be quite vague, such as "Improved wireless network". This is because in the UK the title is published soon after application and companies prefer not to give too much away at an early stage.

The description discloses the invention in a manner that is sufficiently clear and complete for it to be carried out by 'a person skilled in the art' – this means a technician with a general knowledge of the field to which the invention relates. It is important to include as much detail as possible as new information cannot be added after you have filed your application.

The drawings help the reader to understand the description and are referred to using reference numbers or letters.

The abstract acts as a summary your invention and will appear on the front page of the published document.

Finally there are the "claims", these are the most important part of the patent document. The claims set out exactly what is protected by the patent, they are the legal basis for your patent protection and form a protective boundary around your invention and let others know when they are infringing on your rights.

Just as drafting patent claims requires expertise, so does interpreting them to see if your invention infringes on earlier patents. A do-it-yourself search is a good starting point but a comprehensive patent search is usually a job for an expert, who will know which sources to refer to and how best to manipulate them to retrieve the data you need.

It is also important to appreciate that you may have problems if you act on the results of any patent search without fully grasping the significance of the information you have found. There is a real danger that you might compromise your current or future patent rights or infringe upon the rights of other parties. It is important to take advice from a patent attorney or similarly qualified professional before acting on search results.

To make your search easier, you can ask us or a patent attorney which classification your invention falls into. This information is also available from the patents information section of the British Library or from other PATLIB centres.

Providing a patent is kept in force, which requires an annual renewal fee to be paid, it can last for a maximum of 20 years, after which time it becomes free for anyone to use. So, if you do find that your invention has been done before, it may be that the patent has expired or is not in force and you may be able to use the technology or even apply for a patent on any improvements you have made.

It is also worth remembering that even if your idea is not patentable, there maybe other forms of protection such as design registration, trade mark registration or copyright which may allow you to make the most of its value. The Intellectual Property Office can help you identify which rights may be applicable to you, and provide guidance and help to get you started on the road to protecting your most valuable business assets.

For further advice contact our central enquiry unit on 0300 300 2000 or visit our website at www.ipo.gov.uk.

Patent Searching – A Critical Activity

by Colin Cramphorn, Managing Director of Inventions UK
and Chairman of the Institute of International Licensing Practitioners

Many of us have ideas for new products during our life time but very few have sufficient confidence to pursue them commercially and most of those that try fail. All sorts of issues are involved in this apparent waste, not least of which is the availability of funding, and although many of these apparent obstacles are real, there is a lot that can be done to minimise the risk and at the same time improve confidence. To this end patent searching has an important part to play and ought to be high on the list of priorities for both private and corporate inventors.

What is the point in spending time and money developing a new product if it already exists and why not learn from what others have already done? It all seems so obvious but how often is it even considered and at what stage? How many times are private inventors led into paying large amounts of money for designs, prototypes and drafting patent applications when the idea is not new? How many times do companies spend money on R&D for products that have already been designed and are available to copy, often without charge?

It should be mentioned the patent route is not the only way to protect your intellectual property but it is usually the best way to protect functional inventions.

The volume of electronically, searchable records available is massive and increasing through the inclusion of more historical records and through the addition of the never ending stream of new inventions.

Logically it follows that patent searching is critical. In most cases should be undertaken at a very early stage and certainly before there is any thought of filing a patent application. So why is this not happening? The answer is complex, but can be simplified by considering the two main drivers; ego and money. Most inventors, private or corporate, are convinced that their idea is new and as a result it does not take much to confirm their belief. Confronted with the results of a patent search they will often say "I cannot see anything the same as my invention" not realising that this may not satisfy the examiner, a situation that unscrupulous companies may take advantage of.

For private inventors, funding is almost always a problem so they tend to reject any action that involves significant expense and will often choose a cheap option or worse still try to do it themselves in an effort to reduce their exposure. Corporate inventors usually see themselves as designers and do not consider intellectual property rights unless there is a corporate awareness of IP.

If we assume that the inventor, private or corporate, is IP aware then the immediate fear is that it may not be new or worse still that it might be stolen, a fear that is accentuated by the media and many so-called advisors. It is of course a real risk but failure due to insufficient funding is also a real risk and in my experience is more likely to be a problem for private inventors and small companies than the risk of being beaten to the post.

The Internet has made vast amounts of information available and there is no doubt that searching for similar products is easier than it has ever been before but effective patent searching requires skill and a good deal of experience. The interpretation of the results can be even more of a problem and most inventors need help. Some may realise that they need help but do not always consider the importance of the results and their credibility as part of the overall marketing strategy, especially if early licensing is the objective.

I have seen large numbers of inventors over many years with the results of searches which have cost hundreds of pounds and are little more than window dressing, where obvious prior art has been ignored or not recognised and they have been encouraged to proceed with further work and expense. Equally damaging is the willingness of some inventors to accept that their idea is not new and give up without properly exploring the value of any features that may not be obvious but do differentiate their design.

Licensing is a sensible option for the majority of private inventors and the first step towards this is to commission a professional patent search. The results of the search then need to be analysed to asses the potential strength of any protection that may be achieved. This then has to be measured in terms of commercial advantage to justify a potential licensee entering into an agreement.

In my experience a large number of the inventions that are put forward do not have enough potential to justify the expense of a search, but even those that do, have a high failure rate. We expect less than one in three searches will leave the invention with sufficient justification to proceed further. If your invention does survive, this should give you more confidence, help in drafting a patent application and give substantially more credibility when approaching a potential licensee. But be aware that searching is never conclusive and at best reduces the risk.

It is essential that you seek help from a licensing professional at an early stage, preferably before any action is taken. This will almost certainly save you money and improve your chance of success.

4 Protecting Ideas & Intellectual Property – the foundations of success

So often, inventors rush into beginning the process of patent protection too early in the product design and invention cycle. Once begun, the clock starts ticking and when it chimes (all too soon) expensive bills start to drop through the letter box. Must we rush to patent our idea immediately, in case someone else steals it? What is the real risk? Remember the ticking of that money-meter which starts as soon as you file for a patent.

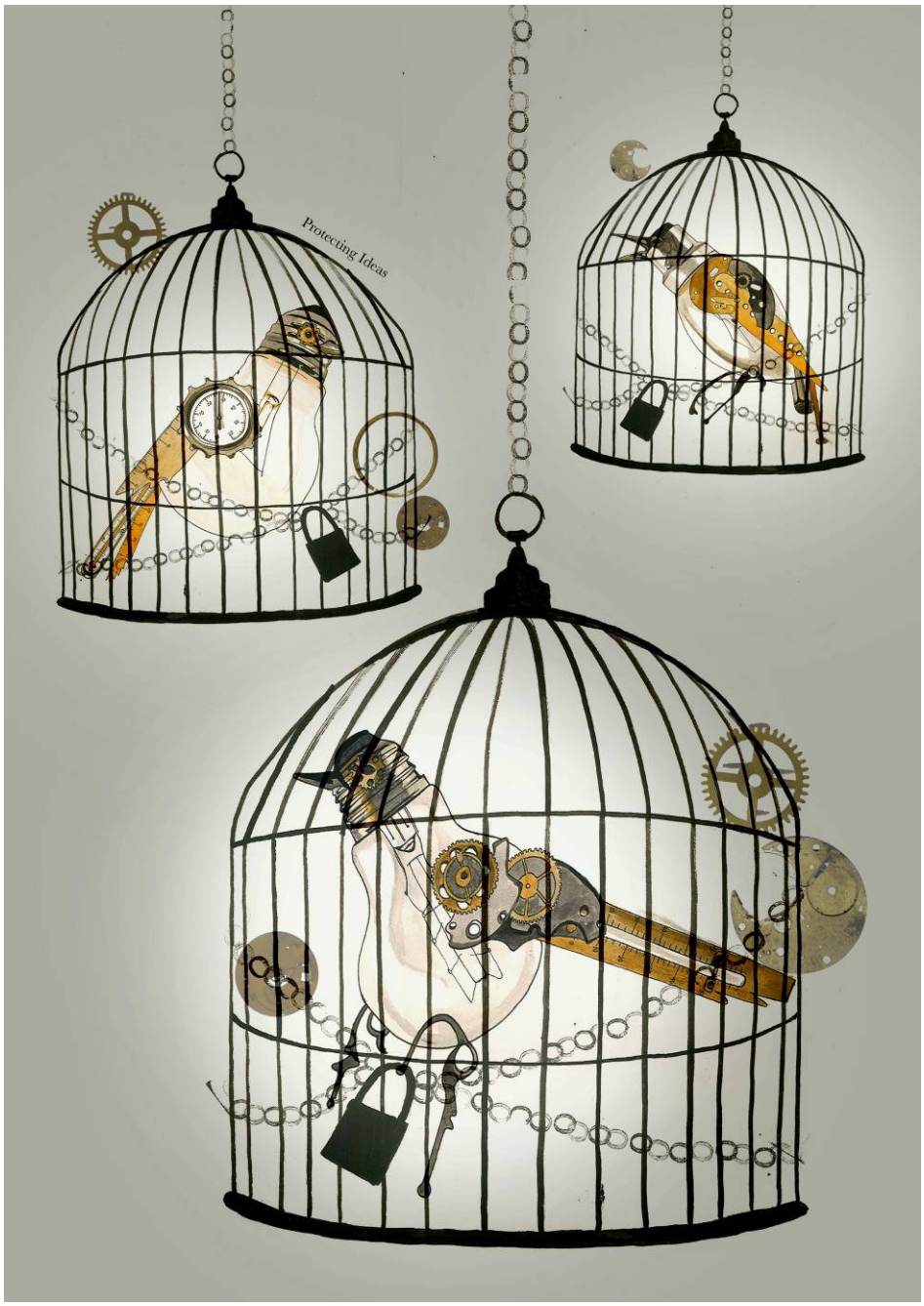
Patenting – What's the rush?

by Colin Cramphorn, Managing Director of Inventions UK
and Chairman of the Institute of International Licensing Practitioners

Before starting to contact companies it is essential to understand the realistic options available to you, as well as the cost and risk involved. Blind belief is not enough and over confidence is dangerous, so formulating a plan is essential and the first step is to determine your objectives. Is it to start up a new business, absorb the new product into an existing business, or to sell the concept on to a third party? The latter is the best solution for the vast majority of private inventors and Small and Medium Enterprises (SMEs).

Handing the project over to a company that has the resources to exploit the idea is usually the best solution but it is far from easy. The process is normally referred to as licensing and is a very specialised area when applied to private inventors and SMEs. To be successful, you will need a product that is sufficiently developed to convince a company that it is viable and that there is a market. You will also have to convince them that you have sufficient ownership to warrant a deal. Companies are not charities and they will not pay you if it can be avoided. So your intellectual property rights are an essential part of the plan. Know how, copyright, design right, registered design, trade marks, company names and domain names may all play a part depending on the nature of the invention.

Inventors tend to be a little paranoid about the risks involved and whilst these concerns cannot be dismissed they need to be managed. The pressure to rush into the Intellectual Property Office is very tempting but the cost implications of this can bring about failure.



'Protecting ideas'

The patent process is the most common route for private inventors to follow but maintaining protection beyond the United Kingdom is very expensive and many inventors will either restrict their protection to the UK alone or alternatively give up altogether. A better approach is to make sure that the project is prepared and ready to approach a company before filing an application, so that a reasonable attempt can be made to identify a suitable licensee once your priority is established.

It can still be very difficult to complete a licensing agreement before the end of the first year when international filings are due and patent costs increase substantially. If this is not possible, the experience gained will be beneficial and will influence the ongoing decisions needed.

The key elements that need to be addressed prior to contacting the company are a pre-filing patent search, the development of the design and production of a model or prototype where possible, the preparation of drawings, art work, any other presentation material needed and the drafting of a patent application.

The actual filing of the application should only take place once the preparatory work is completed and ready to be sent to potential licensees. If a sale can be completed within the first year of the patent application it may well be possible to assign the application to the licensee along with the responsibility for prosecuting and defending the IP.

If a sale is not possible within the first year, a PCT (Patent Cooperation Treaty) application with a life of a further 18 months would provide a total of 30 months to find a licensee but if this is still not possible, careful consideration would be needed with a strong justification for proceeding further with international protection.

An agreement which assigns the IP to a Licensee would require suitable clauses to return the IP to the inventor in the event that the licence is terminated.

Delaying the filing of IP has risk associated with it but this is often less than the risk of running out of time or money. An exception to this is when the invention relates to a topical subject, for instance soon after the Warrington Bomb, we received three designs for a bombproof litter bin within a period of a month. We did not get involved with any of them as there would inevitably have been a conflict of interest but filing a patent application was clearly an urgent matter in these circumstances.

5 Business Planning – planning the commercialisation of your ideas

So often, the much-maligned Business Plan is written and used solely as the potential key to the bank's vault to fund the inventor's project. But they are also an opportunity to collect all your thoughts and dreams about your project into one lucid document. They can be the result of a disciplined approach to commercialising the invention, which, provided you follow the recommended steps in a professional template, lead the inventor through a process in which all the aspects are thought through in a logical sequence. This process shines a light into all the hidden, dark and forgotten corners of a project, leaving no necessary activity unaddressed. This prevents nasty surprises later on.

Business Planning Lets Inventors Sleep at Night

by Alan Finn, Chartered Marketer, Fellow of the Chartered Institute of Marketing and Fellow of the Institute of Direct Marketing.

The Business Plan should be the datum repository of all relevant objectives, progress, technical, market, financial and organisational details of the whole development project of the invention "from cradle to grave" – every detail of the project should be here, a kind of "Invention Log". However, useful though such a log is to the inventor and his teams – you always know where to find any and all details concerning the project – it requires summarising for presentation to others, particularly for banks and investors.

What follows is an example of the simple structure, typical of a Business Plan for presentation to those "significant others". We start with the cover sheet and title page:-

Business plan contents

1. **Vision – the business idea**
   This should be a brief and succinct summary of your idea.

2. **Executive summary**
   A summary of your plans for the busy investors who don't have time for lengthy explanations – but this must capture ALL the essentials.

3. **What the business does**
   What it says on the tin – but using simple, non-specialist or technical language.

4. **What makes the business different?**
   What is your USP – the unique selling proposition that only you have?

5. **Business details**
   This should amplify and expand on the Executive Summary, filling in the details.

6. **Business Goals & Objectives**
   What MUST be achieved, financial targets, market share objectives, the important goals.

7. **Business Strategies and Tactical Plan**
   How will those Business Goals and Objectives be achieved?

8. **Key personnel – Staff**
   Special insurance may be required for key staff.

9. **Legal requirements**

   Does your business require any special legal support, eg professional indemnity insurance, employers, public or product liability insurances?

10. **Sales and marketing**

    How will you reach out to potential customers and then retain them?

11. **Market research**

    The "headlights" on your "business-car". How will you find out how much you may sell and to whom in the face of your competition?

12. **Profiling customers**

    Who are your ideal customers, what do they look like, where are they, how much will they pay, which are the best ones, how will you keep them making future purchases?

13. **Profiling competitors**

    Who are your competitors, what do they look like, where are they, can you rank them by aggression, how much do they charge, what are their terms of business, eg delivery, what are their weak points?

14. **Managing market risks – the Marketing Plan & the "4 P's"**
    A CRM (Customer Relationship Management) software system on your PC will help you to log all the information in 11.), 12.) and 13.) above. The "Four P's" (or "Seven P's" as some prefer) are the constituents of your Marketing Plan – Place (distribution), Price (do you know your costs?), Product (or service details), Promotion (how do you get your sales messages to potential customers?)

15. **Running the Business – Premises, Suppliers, Equipment**
    Think about and plan to purchase, store and distribute your wares – even services need support and quality control.

16. **Operational risks**
    The Weaknesses and Threats from your SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats) will lead you to think about where the risks lie in your business operations – find and then support them.

17. **Finance – start-up costs, Profit & Loss and cash-flow forecasts, funding**
    These are the critical financial plans on which investors will focus and probe – make pessimistic assumptions and know your plans backwards, forwards and sideways.

Notes and Appendices

The Business Plan will be presented to investors as a succinct description of your business idea and you should always look at the plan through the eyes of those not directly involved. Trying it out on members of the family may not be a good idea. However, the family bank manager, or, better still, perhaps a neutral bank manager, may give you some ideas to sharpen it up.

6 Raising funds – obtaining the money to make it all happen

Money – 'filthy lucre and the root of all evil' – is the necessary lubricant to allow the invention to slip smoothly along the invention process, through to commercialisation. Unless the inventor has substantial personal finances, most inventions will require the injection of investment funding from sources which will regard it as a risky investment. This risk is greatest at the very earliest stages, before the invention is being sold, and raising funds requires the greatest level of creativity.

Even in a recession, investors are always looking for a good investment opportunity. When grants and loans from government agencies dry up, to allow the government to rebuild its balance sheet, then private investors can fill he gap. Often, groups of investors provide tiers of investment to fund projects through the critical "pre and post revenue" point. That is, when you begin selling the product. Before that point, in the "pre-revenue" situation, investors see only risk. But the cash-flow becomes measurable in the "post-revenue" period and so risk can be better quantified and is regarded as lower. So groups of High Net Worth Individuals (HNWIs) will group together to fund attractive pre-revenue projects, and, when sales appear and further investment is required, the next step is provided by associated Business Angels who will invest sums of typically up to £250k. Later, Venture Capitalists allied to the group may provide the final step for over £1m…. They will demand a large percentage of profits because high risk justifies big rewards, but better a smaller percentage than none at all!

MicroFunding – Opportunities for Inventors

by Chris Clegg of MicroFunding

Does getting investment for your business have to be scary? Well it can be quite challenging, you have to be persistent and there is no guarantee of success. But intimidating? Not really. Not, at any rate, if you know what you are doing.

While programmes such as the BBC's Dragons Den have helped raise the profile of the Business Angel market, they are undoubtedly more about 'good TV' than about 'good business'. What they have done, though, is clearly demonstrated the need for anyone seeking finance to be fully prepared and sensibly advised. Without that, it is not worth going in to see anyone, let alone try and attract the combined net worth of the Dragons.

If the idea you have developed is sound and you have the right guidance on how to present it, raising finance needn't be as daunting as you might think. The key is to put yourself in the shoes of the investors – what would make you part with your cash if you had it to invest? That will give you a good start, but how do you go about it?

It might seem as if 'money is money is money', that there is only one kind: and you get to spend it.

But for those people who have enough money to invest, either of their own or on behalf of others, it can be a very different story. They often have very specific requirements as to what happens to their money, what conditions are attached and what they expect in return.

And if an entrepreneur doesn't appreciate the differences, he is unlikely to succeed in persuading them to part with it.

An understanding of all sources of money is very important, not only because it's essential to get the 'right kind of money'. Often an entrepreneur will wish or need to approach several different sources at the same time, and equally often a combination of different 'kinds' of money is right for the business.

For any successful business the potential Rewards must be bigger than the Risks, and this is certainly a judgment made by anyone choosing to back the business with money. To attract their funding, you must assess, quantify and make judgments about both the risks inherent in your business and the potential rewards you are able to offer. You need to understand in depth what Investors want to know, and how you make sure you tell them precisely that. Which means understanding how to analyse your business in the same way that they do.

We will look first at all the various sources of money, because it is important to bear in mind that it is very likely that you will need money from more than one source. But we shall focus on one: the most difficult, Business Angel money.

Armed with a fair understanding of who is looking for what from their money, you need to work out what 'kind' of money your business needs, and then put your case so that they buy it.

The first step in obtaining funding is to decide what you need the money for: short term survival while customers pay you, or to cover quarterly VAT; longer term finance of capital equipment or plant; investment in people to make something happen which is currently under-resourced…or for what? Whatever the reason, it will have a risk profile that you'll need to understand and match with the best source, in order to make a case that fits with their reason for funding.

Which means you will have to know what you have to offer in return that is going to match with what they are likely to want. And then you have to decide if the added values that are on offer with the money are deliverable and are things that you want. You must decide if the cost, both financial and in terms of restriction and control, is worth it to you.

Banks

If the money needed is not at significant risk of loss; if it is needed only temporarily; or for a definite low-risk purpose and timescale; if both the business and its principals have good credit records; if there is security on offer to underwrite the money against loss, then a bank or similar will be able to provide the necessary. A bank is a financial institution whose primary activity is to act as a payment agent for customers and to borrow and lend money. It is an institution for receiving, keeping, and lending money.

Banks – and other asset lenders, such as factors – allow the borrower to use it for a while and pay 'rent' – interest – on it. The cost of this money is usually reasonably modest, meaning that the lender's reward is commensurately modest, which in turn means that it is not going to take risks. Clearly they will put conditions on the terms under which they will be prepared to lend.

And they will want their money back, often on demand, which is most likely to be at the least convenient time for the borrower. The key to getting their attention is to present a plan that is not going to cost anyone their job: it must look safe, thorough and generate more than enough cash to pay their interest, and give a near-guarantee of being repaid in a reasonable timescale.

Banks have to raise funds from other people themselves. Their shareholders provide the bank's capital base, and this is leveraged with additional borrowed money. Both shareholders and the providers of additional funds want a return, so the bank has to use the money at its disposal to make a margin: it has to lend it out at a bigger rate of interest than it has to pay. And it has to do so without taking any unnecessary risks: as it has to repay its debts, it has to know that its loans are safe.

It only makes profits for its shareholders by using its money, or by selling other of its financial services to its customers. So if a business approaches a bank for money, it is going to have to do something in return that makes the bank money, and allows the individual bank manager to further his career – and definitely not jeopardise it! So it is very likely that the business will have to have do its business banking with it, and insure with it, as well as provide various securities to limit the downside for the lender.

Asset Backed Lending is a fast way to raise corporate finance, so long as there are assets both available and unencumbered. The major problem for the early stage business is that there are rarely valuable assets to borrow against.

If the purpose is to get a business going, expand it, or develop a new side to it, the outcome can not be guaranteed. Risk is involved and banks will not be interested, so other sources of money must be found.

If very lucky, a business can be given money. Obviously this comes with the toughest set of rules and expectations.

Grant and Awards

There are (probably?) thousands of sources of Grant, Award, Charity and Trust money, on offer for a host of different things such as employee training, vocational education, environmental improvement, business development, right up to specific awards for original product development and research.

Where the money is needed for something that somebody has decided is for a 'greater good', a grant just might be available irrespective of the risk just because 'they' want the desirable outcome. Grants aren't just about handing out money to any aspiring business, they are specific. And they often insist on some form of 'matched funding', meaning that you may have to go elsewhere too.

Each year there are also numerous awards are also up for grabs. These usually recognise achievement, and can often bring publicity as well as financial support. Awards are therefore a limited source of funding for some businesses, giving the few businesses who qualify a significant boost to their development.

Grants and awards are particularly suited and available to various specified categories of applicant, such as Start-up businesses, Younger entrepreneurs, Businesses in industrial areas with above-average unemployment, Businesses in rural areas, and any business with a specific project in a currently favoured area. To qualify, a business will normally have to fit at least one of the criteria of geography, or stage, or specific purpose.

Each grant will be awarded for its own particular reason, and have its own set of idiosyncratic rules. Applying for it will be a one-off process, so applying for several grants is a major undertaking. To know about them can be difficult and time consuming; to apply for the more worthwhile ones is often painful; and actually getting funded can be a great achievement. The only way to succeed is to do exhaustive research about the grant and the awarding body to ensure the application is appropriate, and then go through every hoop and over every hurdle they put in the way. It is exhausting, but if the money and the pay off are large, it could be very well worth while.

More often the business will not qualify for a grant and the money is definitely at commercial risk, so there remain only sources of risk money. These are people such as Business Angels and Venture Capital Funds who accept the possibility of losing their money, but in return they will want a much bigger potential reward. They will want a share of your business, or equity.

Business Angels

Business Angels are Investors in (usually small) unquoted companies with high growth potential, but such investments are also high risk and illiquid – there have to be some awfully good reasons why anyone willingly invests in such opportunities.

What are Angel investors looking for? Part of the reason they invest in early stage opportunities is that they like the game. Early stage is the highest risk, but it's very exciting and the most fun.

The Angel investor is often looking specifically for involvement – for lifestyle, for fun. Almost without exception, Business Angels want more than just financial returns. Many want to be directly personally involved in the businesses they back – rather than just 'entrepreneurship', think 'grandparent-repreneurship'.

'Angel Investors do exist'

Private Investing is not for the faint-hearted. Angels will want to see the promise of substantial returns, and some control over how they are achieved. They will almost certainly want a directorship, and impose various conditions about information and management to keep on top of what is happening in the business. These will be dealt with in the subscription agreement rather than through the shareholdings. So while they probably won't want above, say, 30% or 40% of the shares, they may well want more of the vote, or at least a veto over all major decisions.

A frequent issue for fundseekers is the fear that an investor wants to take control of your 'baby'. Fundseekers should have a clear idea of the very substantial non-financial attributes – skills, contacts, sector experience and so forth – an investor can bring, and what they would ideally like in their investor; how much they want him to be involved; then they should go look for it.

Business Angels are individuals, and obviously have as many different qualities as there are Business Angels. Generally, however, they will tend to be very experienced and successful businessmen who add value in several ways: by introducing to other funders; through introductions and selling to key customers; with advice on strategy and exit structure; by attracting, introducing and recruiting new talent; with introductions and selling to strategic partners; by adding presence and credibility to your proposal; by acting as a mentor; and not least by raising the status and profile of your business by adding his name and personal reputation to it. You might well expect to pay some kind of price to get all that.

While Business Angels do not invest primarily for the attractive tax breaks on offer, the tax certainly helps, and steps should be taken to ensure that everything is done to enable them to qualify. A little appreciated fact is that The Inland Revenue is by far the largest contributor to Business Angel funding in the UK.

Tax Reliefs are available to investors in the right circumstances: the Enterprise Investment Scheme (EIS) gives equity investors in Qualifying companies several valuable tax breaks, and is relatively easy to arrange.

Institutional Investors

Like most Business Angels, some institutions regard early-stage investment as a distinct asset class with its own set of challenges and opportunities, regardless of sector: they are considered generalist investors. Others focus solely on sector specific businesses such as technology, biotech, environment and healthcare.

Typically, institutions will look for propositions where the business concept, management quality, market structure and distinctiveness of product or service can propel a sustained and growing business. They use other peoples' money; having their own investors to whom they are answerable means that they in turn need to invest in businesses with a high chance of exceptional reward. They look for businesses operating in fast-growing niches that differentiate themselves from their competitors and protect their differentiation. They will sometimes even be prepared to change the management team (you) to achieve this.

Timing of the Investment Process

As well as thinking that other people will part with their money easily, many people seeking funding also make the mistake of seriously underestimating how long it will take to get funds. How long is a piece of string? For the fundraiser, who frequently doesn't appreciate what is involved, far too long: you want funders now. Needless to say, that is the last thing a sensible investor wants to, or should, do.

Banks and Grants have their own bureaucracies and timescales. Sometimes, applications for specific grants are invited only once or twice a year, with definite cut-off dates.

Business Angels, being private individuals, are different. It normally takes some four months or so from starting out. By the time you've re-written your plan (ten times!), discussed the ins and outs with all and sundry and engaged a Business Angel network, it'll be two to three months before meeting the first potential investors. Then it's around four weeks of meeting investors/principals and key people, a further two or three weeks in feedback and discussions.

If you're still there, you'll now be thinking about Heads of Agreement and negotiating terms, which will be another two weeks or so; around week fourteen or fifteen you'll begin to get lawyers involved and – if you push hard – you'll be signing subscription agreements within five or six months.

Investment Etiquette

Every fund seeker is looking for money in order to fulfil his dreams, and may have already mortgaged his life on the way. So it is only fair to expect an investor to behave reasonably. Most will, but not all. Most will also sign a reasonable confidentiality agreement, but larger companies and Institutions may be unable to do this because of their size. Professionals who work in the sector also are unlikely to sign, as confidentiality is their profession.

Understanding Risks in Business

All business involves risk, but of course that does not always mean that it's dangerous. If you are hoping to raise money from any third party, it is of fundamental importance to have an understanding of how they perceive the risk that you and your business present to them. If it's too great, you will have a very uphill struggle.

The fundamental issue for the investor is whether or not he will be safe making money out of it. What does he see as the Risks? What are the implications for him, his money, his lifestyle, or his job? It is also essential to appreciate that the Investor might well see himself to be at risk in several non-financial ways: Personal Risks also include threats to his Reputation, Time, Lifestyle, Commitment and Privacy. You have to be aware of all his potential downsides, and make sure that you behave so as to minimise any concerns he might have.

Recognising Risks is probably the easy bit to do. Business is all about recognising what might go wrong, assessing and pre-empting it with sensible actions. All competent businessmen have to do this all the time, sometimes consciously and just as commonly subliminally: it becomes second nature. It is easier to do if you put the risks into categories, and have a look at each category separately. For convenience, we break business Risks into five independent types: Vision, People, Stage, Motivation, and Model. This is not to say that they are all equally important: by far and away, the biggest risk factor in every business is People, the management team.

Vision

Vision is what gets people going. If there's not much Vision, Business Angels won't be excited, so won't invest (unless you have a rich uncle!). So for them, Vision has to score very highly, by definition. Vision includes what it is you're trying to achieve, what is the overall concept? Where is it in the marketplace? Is it revolutionary, trying to change peoples' habits or technology, or is it evolutionary, doing an existing something better, quicker, cheaper? Are you focused on a goal, or do you have a bit of a scattergun or butterfly? What is the scale of your proposals how big could it become? What it its scope, could it expand into other vertical or horizontal market niches? Is the timing right for what you are doing?

People

The vast majority of businesses that fail to get funded fail here. It is people who will get the Vision from plan to reality. They are the keys who make it happen, who turn the idea into Bank Balance. People must score very highly. But what does an investor look for in People? To get across the right message you really need to understand that potential investors are seeking to back you, and not your idea. Do you really understand what you are selling? It is not at all the same as what your business sells, you are selling a share in the profits of your business. And it is your competence in doing this that will persuade the investor to trust you with his money.

There are four fundamental aspects to management competence. What is your Experience, your track record? Have you done anything like this before, or anything in business at all? One useful trick at an investor's disposal is to ask for an early version of a previous business plan, and then see what's happened to it since. It is sneaky, but you must remember that he is protecting his money and any sensible investor will want to test you out.

Next he will try to assess your management capability: can you actually get things done? Can you grow a business? Can you implement, and get others to do it too? Can you motivate others? Are you a Manager?

Then of course he will want to reassure himself that you do indeed know what you are talking about: what is your Knowledge? What do you know, and how relevant is it to the business? What expertise do you have in the industry, in Sales and Marketing, in the relevant technology, do you have a list of (real) customers, are you financially competent? Do you fundamentally understand what is required in running a business?

And finally, he will put it all into the context of your character, as it is all very well scoring highly in all of the above if you are not reliable and trustworthy. What can you put across about your honesty? Are you easy to deal with, how strong is your character? Can you listen, and work with others of different opinions? Can you learn, are you hard working, what is your commitment? Are you enthusiastic and personally likeable? Could the investor work with you in the longer term?

All of these have to be present, where relevant, in both yourself and your team.

Stage

It is overly simplistic to generalise and state that early stage businesses are 'riskier' than later stage businesses. But until something has been proven – the business model, the people's ability to cope, the marketplace, and so on – it is by definition unproven, which means it might never be proven. That is another way of saying it is riskier, albeit moderated in practice by many other factors.

Model

It is worth making a quick note to clarify one essential point: a business model is often easily confused with the management's ability to implement it. The model is 'management independent' – a matter of theory: is it elegant? Should it work? Does it depend on 'magic moments'? How competent would you need to be to implement it? Have you remembered you can only recruit people, not super heroes? Distinguishing between Model Risk and People Risk can in practice be difficult. Is it the model that is creaking, or is it the people who are incapable of running it properly?

The business model you propose is possibly the least important factor for a Business Angel or Institutional Investor, because if they like you and your people and your vision, they will help with your model. But model is everything for banks and grant funding, as they do not want involvement, they just want results.

As with people risks, business model risks can usefully be analysed into four independent factors. Of fundamental importance and by far the most significant is marketing and sales: how do you propose to capture revenue from the marketplace? What is your product: what are you selling, is it protectable, can it be made to a price, is it saleable…and so forth.

Next, how do you propose to operate? Can you deliver? Are your operations in line with and sensitive to your planned growth? Have you thought it all through? At sensible salary levels? Does what you propose look effective and efficient? Are there any requirements for regulatory compliance, and if so have you obtained all the necessary licences and permissions?

Have you budgeted for enough (and not too many!) resources? People? Money? Space? Information? Technical? What skills resources and relationships do your management already have? What are the potential problems and disasters? Have you provided enough resources to cope with the unforeseen?

The final factor is finances, which is not simply the obvious is there enough? It is as much about the controls and information flows in the business: who is in charge, and of what? Are they to be trusted to look after money? What information is collected, measured, how, why, for whom, given to whom, with what result, repeatedly, consistently and compliantly? Are there any questions arising? How does that compare with experience?

Motivation

Finally, what is your motivation? If you're not seen to be motivated, you haven't got a hope.

Looking at what has already been demonstrated before you wrote your plan, not just what have you already sacrificed for the business, but have you become too involved in it: is it your baby? Will you be able to let go? Are your personal and family goals in line with your business aspirations? In other words, are you exit or lifestyle oriented?

Having got to grips with the risks inherent in the business, it's time to see what it's all been for – the rewards.

Reward

How much reward is needed to attract a funder? A Business Angel will be looking to get a minimum of a 30% return per year; you might feel this is excessive, but it is absolutely necessary to cover his deals that do not work. The trouble is, how do you ascribe a value to a 'business' with no sales and no balance sheet? Reward is the cash an investor ends up with after making a successful exit. What and when this will be is of course unknowable, but estimates have to be made. Usually, these will be based upon a guesstimate of an exit value based upon projections of your financial model, which is built on guesstimates of a dozen or so assumptions, adjusted for a guess of the investor's shareholding and discounted back to today's value using guesstimates of interest rates and inflation. In other words, hardly worth bothering with at all!

A very useful tool to use in refining this process involves the concept of Uncertainty.

Uncertainty

Uncertainty is the confidence level we ascribe to measurements. The uncertainty of a measurement is often stated by giving a range of values which are likely to enclose the true value. This is often shown as error bars on a graph, or as value +/-, for example 'The value is £1m +/- 40%'.

It is perhaps best explained using a common business feature, debtor days. Nearly all business plan projections involve making an assumption about how long it will take to get paid, and for simplicity often use 30 days. So all the projections and forecasts, including the 'exit value' described above, are based upon the assumption that customers will pay their bills on time in exactly 30 days. Have you ever even seen a real business where they actually get exactly 30 days with no variation at all? More relevantly, have you ever seen a real business where they get anything even approaching 30 days? More likely, real businesses do well to achieve something like 47+/-12 debtor days. In a typical business plan, each of the financial assumptions is very specific. This is clearly a gross simplification on real life.

We have identified 10 independent variable assumptions, 6 of which vary in both of two ways that contribute to a business model, each of which is 'uncertain'.

Each of the assumptions is given a range of values, rather than a single number, and each range is arrived at after detailed consideration of the proposed plan implementation. If you look at the assumptions you have used in your financial forecasts, how probable or realistic are they?

You need to make sure as far as you can, that your financial uncertainties, that is the assumptions you use in your projections, are realistic, manageable, and/or amenable to control. How much could they be influenced by external factors? What could you or should you change, or improve? Looking at the financial assumptions, you decide what – realistically – could go wrong, and that is a great place to start if you want to be in a position to do something about it.

Inevitably, in early stage business the risks will be assessed as 'above the norm', and the uncertainty range will be wide. This is, of course, not as nice as being able to be precise – but it is what it is. It is very important to maximize your use and understanding of both risk and uncertainty in order to give yourself the best chances of winning.

We have looked at who controls what kind of money, what we understand by risk and uncertainty, and gained an insight into what potential funders will be looking for from you. Now it is time to investigate what funders are looking for in a plan, and how they decide if they wish to meet the authors. If you can get that right, at least you'll get to meet them and put your case.

Writing the Business Plan

This section is not really about what to put in a plan, as there are hundreds of sources that give excellent guidance on business planning. What this section explains is how and why you need to put in what you do.

What the Business Plan is for

What, ultimately, is a business plan for? First and obviously, it's a written document that explains what the business intends to do, where, how, by when and with whom. And, of course, how much money it's going to make for whom.

The funder will try to understand the business by seeing if he can visualise who wrote the plan? The principal, or an adviser? Who owns the ideas? Is it a plan or a wish list? Was it written as a strategy for the writer? To give him a road map? Do the principals come across as knowledgeable – or are they 'winging it'?

For which audience it was written: a bank, or management peers, or potential funders? Or whom? The plan is written and expressed specifically to address the issues that the target might have, and to appeal to those of his instincts that will motivate him to say 'yes'. So a plan for target A may well be completely inappropriate for target B, and so forth. It has to be written with cunning. You wouldn't make a sales pitch to Company A using Company B's data, would you? And, because the funder does not exist who does not want to reduce his exposure to risk, he will almost always try to share the risk with other funders. Inevitably this means you may have to write two or more versions of your plan, each appropriately tailored.

Does the first page make the reader want to find out more? Paradoxically, the plan for Business Angels should not give everything away. More than enough to get your target's juices flowing, but not too much. If you answer all his queries in the plan, and he's not quite understood so he doesn't ask to meet, you'll never have the chance to put him right. It's to make the target want to meet you so you can persuade him of your credentials and abilities. He might be missing out on the best deal ever: you owe it to him as well as yourself to get the plan right, and to tempt him into that meeting.

Great entrepreneurs don't have to be great writers, but keeping it simple and clear is a must. Don't let bad writing obscure your brilliant ideas, and don't give the funder any reason to put the plan down. Make sure you don't blind anyone with jargon. Jargon isn't clever, as it could well hide sheer brilliance within; don't assume that the target will understand (or even be remotely interested in) the technical details. Mr Walls did not succeed in selling billions of pork sausages by explaining in detail how they are made; he sold the 'sizzle'. Leave the 'techy' stuff for the appendices. And if you have any, include historic / opening accounts and balance sheets in the appendices too.

Your plan is a sales document, an advertisement. It is aiming specifically to raise money from someone who has the money you want. But be very careful: if you go directly after the money, the man will run a mile; if you go after the man, he will bring his money with him.

And do remember not to fall into the trap of the Number One Mistake: your plan is not about selling your widgets, that's what your business does. Your plan is selling a share of your business profits to whomsoever: your widgets are just the way your business makes profits. So in order to sell shares in your business, you need to establish that you have what it takes and that you can provide your target with comfort that you can give him what he wants, with minimum personal exposure to whatever he doesn't want. In particular, if you are going to have any chance at all of getting him to part with his money you need to demonstrate beyond any reasonable doubt that you know what you are doing with money. Or why should he trust you with his?

How to Plan your Business

The best plans are written backwards. You know where you are now, and you know where you plan to be in, say, five years' time. So if you know where you'll be in five years, what will the business have to look like in four and a half years if you're going to get to five as planned? And in four years? Three years? Two years? And one year? And what resources do you need now to get there?

If you write your plan this way, you will almost certainly have to do it on a spread sheet, and that is right. A business plan is financial: it's what the Profit and Loss, Balance Sheets and cash flows will look like and be doing at various times in the future.

And as the future is a projection, the plan depends upon what assumptions you make about things. The market, sales, prices, inflation, interest rates, costs, people…the list goes on.

Some of the assumptions – interest rate, exchange rate – are about external factors, over which you will have little control but which could have significant impact on your ability to keep to plan. Other assumptions are very much under your influence: as we have seen above, debtor days is an obvious case in point. Yet others are a mixture: overheads combine external costs – e.g. utilities – with your use of them, efficient or otherwise. So your text has to explain why you chose the assumptions you have used, and with what certainty you apply them. Introducing Uncertainty into your plan demonstrates your competence as a manager, how you recognize and manage the risks that you've identified. How you ensure the business goes to plan.

Describing how you make sure that that is what happens is just commentary: essential commentary, but commentary even so. And it is backed up by your CVs to provide credibility.

And the commentary needs to excite the target in the way you intend: hit his hot buttons, whatever you have decided they might be.

How to Present your Business Plan

It is tough to do, but essential: you need a one-page summary on the front. It's designed to make him want to read on. You should not use the front page for just a title: the target can forget a title, but he won't forget 'What's in it for me'.

You should arrange your financial forecasts into just three pages to cover all the projections. There should be one page for the Profit and Loss projections, one for the Balance Sheets and one for cashflow. Ideally, you should link all these summary figures to the financial assumptions you have made.

And then get the commentary into a maximum of just ten pages. It is very difficult to do, bit as Winston Churchill once famously said: 'I am going to have to make a long speech tonight because I've not had time to write a short one'. You should make your plan exciting to read, full of interest and potential, without being over the top. You should treat your target as very intelligent but ignorant, which means that you have to explain everything, clearly – but also that he is very quick on the uptake so do not labour any points and explain things once, briefly. You should consider your target's personality and concentration span: write to appeal, not bore or overpower

Finally, and especially, funders do not like surprises. If you have anything which could come out unfavourably in due diligence (usually track record, but could be anything) get your retaliation in first by explaining it your way in the plan. It might be hard, but it is so much better than if he finds out afterwards.

How many versions should you prepare?

Business Angels will ask to see various lengths of your plan: some will want the full works, while others will not want to read all that but 'please just send me a two-pager'. Others will want 'a one-pager', or even a brief executive summary before going to the trouble of reading the whole plan. So it is, unfortunately, worth getting them all ready in good time.

How to Pitch

Most of the time, you will be unprepared for a pitch. Why should that be so common? Because, most of the time someone will informally ask you 'And what do you do?' Because you are not particularly expecting the question, and the situation is casual, you will probably bleat on for a while, then give up when they lose interest. And not merely is that not very socially clever, it is a real waste of an opportunity. So put as much effort into your pitch as you do into your plan. It's what you will be measured on: how you present. Practice, feedback, think: again, again and again! As Lord Birkenhead said of Winston Churchill: 'Winston has devoted the best years of his life to preparing impromptu speeches'.

In practice, there are two kinds of pitch. The wholly informal, as above, which you never know can lead to surprising new contacts and networking; and the highly formal prepared pitch which must last for exactly so long. The meeting, when you meet your target funder in more-or-less informal surroundings, is when he will try to find out what it is that makes you tick.

But even though pitching comes in two types, they are the same in principle, and they both need practicing.

The formal 'pitch' is when you are trying to interest someone who has not read your plan, and the purpose of your pitch is either to get him to want to read it, or better still to get him to a meeting without reading the plan. This formal pitch should not be a verbal repeat of the written plan, because people respond differently to speech, but it should, of course, be based on the written plan. There are, inevitably, important considerations in pitching that you should bear in mind.

You must start off with an Introduction, which tells them what you are going to say, followed by the main pitch when you tell them what you're saying, and finish by summarising with what you just said. You should keep it simple, covering only the essential points of what, why, when, how, where, who – and how much. As with the written plan, work on various versions. Work on your 'sound bite': 'I do 'XX' and I need £YY to do it. And I'm looking for someone who can add more than money – I need a ZZ guru'. And, as with the plan, you should prepare a 5-minute, a 10-minute and a 15-minute version. And also do a version that allows greater flexibility, for when you are talking with your funder target informally.

Remember that when you are talking, you are saying what you think you should say. When you are answering questions, you are addressing what your audience wants to hear. There is a big difference, so never take up more than half of your allotted time on your pitch. You should then invite questions from the floor. In your pitch, leave details unanswered: leave that for the questions. Remember that you want to answer questions (plural), so when answering questions, answer fully but briefly: solicit more questions, don't go on and on.

The Meeting

Finally, you are going to meet someone who has read your plan. The principle is exactly the same as an informal pitch, keep to the point and do not bore with lengthy answers.

He may well try – possibly quite subtly – to put you off. Don't be surprised if he refuses to listen to a prepared pitch in a meeting: he may well simply say 'Yes, I understand all that – but without notes or prompts, I want to find out if you understand it too'. You need to keep in mind that he's not trying to find out about your business, he's trying to find out about you If he likes what he sees, he's going to decide if he can both trust his money with you and work with you.

You will be tested with the awkward questions; about your assumptions; about your credentials. Funders will always listen closely to your answers in order to ascertain how flexible you are. Can you cope easily with challenge? Will you be amenable to working closely with them, or will you insist on doing your own thing exclusively, can you learn, or do you give the impression that you already know best?

They will pick out something to ask you about – it doesn't matter what – to see if you really understand your plan. Your case will be tested to destruction, and not wholly to see if it does destruct but to see if you self destruct too when under pressure.

It's worth repeating: you are not selling widgets, you are selling you and your ability to make money from widgets, especially when it goes wrong – which it will.

You have to know the business inside out: and if you need your right hand man with you because he's the one who understands the money side – or whatever – take him with you! No funder of any colour will put his money your way if you even look like you're not on top of your game. No excuses.

Do your rehearsals before the meeting, and not with the funder. Do not even think about 'winging it'. You won't get two chances.

Things to bear in mind, or to ask Investors

Once you get the scent of funding in the air, it is all too easy to forget that any relationship you might be forging with a potential Investor has to work in the longer term. Despite the urge to take the money, you really, really might be better off walking away from a deal that is not right. What is better – an investor you get on with, or one with the amount of money you want?

You need to ask yourself if he is paying enough for the amount of equity he wants, how much of the business will you have to sell to get him on board? Having said that, one very common observation from Institutions in later rounds of funding is that Angels generally value businesses too highly, which makes it difficult to do a 'down' round later on. So you will need to adopt a strategic view if you hope to succeed.

The Investor will have been thorough in his due diligence on you, you should be diligent on him too. How has he performed in other deals he has done? To what extent can you check him out – and if not, what does that tell you? Most active investors do make money over the years, but to do so they have to maintain an active portfolio so there should be plenty of referees. Will he want to appoint a director, so how much control or influence will he want, and will it be properly documented in the Subscription Agreement?

And finally but by no means least important, what exit route does he expect, and when, and what is that likely to mean for you, your investment in the business and your role?

Where to find Investors

It is all very well having a brilliant idea and excellent plan, but without anyone to pitch to it would be all rather pointless. This section is, however, very short – only a few years ago, there could have been much written about 'How to find a Business Angel', but in the day of Google and the Internet, it no longer presents a challenge. There are many Business Angel networks and groups, some exclusively on-line and others supportively hands-on. A productive approach is to contact as many local networks as is reasonable for your time and effort, and explore with them how best they could help you and at what cost.

Where to find Business Help

Just as with Business Angel networks, there are hundreds of consultants in both the public and private sectors who are keen to assist you with your business and help prepare your business plan. And just as with Business Angel networks, a very productive approach is to find out exactly what each can offer before committing to any. Some will be both excellent quality and excellent value, some will not. And some which are excellent might price themselves out of reach, because excellence has a cost and not everyone can, or wants to, afford it.

In order to attract equity funding, an early stage business has to have both these essential attributes:

- An excellent business opportunity
- An excellent management team

As a rule of thumb, out of every 100 business plans that a professional Investor sees, 98 will fail immediately for one reason or the other. It is not a good statistic, and only about half of those that pass this test end up with investment.

So what can someone with a great idea do if he has no desire to get involved in this attritional process?

The traditional approach for the Inventor

Essentially there are two traditional approaches to helping inventors make money.

> One option is provided by the many businesses that help by taking an idea and exploiting it in house. The major difficulty with this approach is resource: no matter how excellent a service they provide, and how successful they are, they have major capacity issues because of resource shortage. Basically it takes a lot of time and effort to exploit one idea, and without unlimited people and cash these business can do little more than scratch the surface.
>
> The second approach is that provided by Incubator Hubs, Enterprise Centres and so on. They take the inventor and try to improve his business skills. Of course with a few they succeed, but very soon the centres become clogged up with not-yet-succeeding-but-not-allowed-to-fail enterprises. So they too have major capacity and resource issues.

There is now an alternative solution.

microFunding

Because of the difficulties in getting funding, how many great business ideas does UK PLC lose every year – just because there's no way to exploit them? They don't even get lost overseas: they simply don't happen. Why is there an explicit assumption that the generators of great ideas also have to be great entrepreneurs if they are to succeed? Big business knows better – it clearly separates the ideas generators from the ideas exploiters.

And the resources are there. Britain is a nation of highly creative inventors, and it claims many thousands of highly competent businessmen many of whom would love to run his own business. Britain also has many thousands of Business Angel investors all of whom complain about having a lack of good quality deal flow.

What microFunding does is simple. It allows them all to meet each other. The microFunding Exchange is three-way business generation process whose web based data management engine can be white-labelled under any website. It introduces Inventors, with brilliant ideas but without time or means to run a business, to Managers with proven skills and experience of making serious money for other people and who want the chance to have a real interest in their own business, to Investors with the money and motivation to back exciting early stage opportunities provided they are managed by a skilled and experienced management team…with the intention that they all make as much money as quickly as possible.

It gives the Inventor the chance to have his ideas protected and exploited on his behalf to the maximum extent by experienced and skilled business managers without the need for further personal commitment, yet still keep a big stake in the success of his ideas.

The Manager is highly motivated. At his own risk of time and reputation he selects only ideas that he believes have a real chance of succeeding, and his rewards arrive only at a profitable exit – and the sooner the better for everyone.

And every Investor would like to cut his risks and maximise his rewards. The microFunding process is specifically designed to do that. By investing small sums in the not-for-profit 'Proof of Concept' stage, Investors absolutely limit their downside risk. By backing sector experienced managers who select their own projects at their own time and reputation risk, Investors give themselves every chance of a highly successful outcome.

The microFunding Process

Inventors post their ideas securely and confidentially on the microFunding Exchange through any introducer's website. The Invention should be described in terms intended to excite the interest of a Manager but without (at this stage) disclosing any secrets, and often the Introducer will help him with this. When he is happy with his description, he posts the Invention so that it becomes visible to Investors and Managers.

There is no sector bias or expectation: any business ideas can be posted. A relevant observation, however, is that those ideas with protectable Intellectual Property are far more likely to be selected, as they offer less risk to offset all the effort of exploitation.

The ideas with most promise are selected at their own risk of time and reputation by experienced managers, all of whom are bound to confidentiality. The Inventor is sent a copy of the manager's CV, and if he agrees then the two are introduced. The manager needs to see if the idea stands up to closer inspection, and both need to find out if they could work together to progress the potential business.

It is important to understand that the Manager is not a consultant to Inventors, nor is it his job to help them exploit their inventions. It is the Manager's role to identify, create and run a business, often without any significant additional input from the Inventor beyond the initial idea. It is entirely up to the Manager what happens, how it happens and with whom it happens; and although the Inventor will no doubt contribute his own ideas about how things could develop, control is with the Manager. Indeed, the Inventor has no right to demand to be involved in the ongoing business beyond being a significant shareholder, but in practice the manager will usually want his technical expertise in the team.

The next step is for the Manager, at his own time and reputation risk, to define a not-for-profit 'Proof of Concept' Project to test and confirm that all the factors needed to realise commercial potential are there – protectable intellectual property, market, price points, manufacture, and so forth. By eliminating less viable inventions and identifying the winners early at little cost, the Proof of Concept Project gives Investors the chance of real Rewards at reduced Risk. The Manager specifies what the 'concept' is and its proof by whom, by when, at what cost and to what criteria. The Manager decides how, or through which authorised Investor organisation, to raise the funding needed for the 'Proof of Concept' Project.

microFunding Ltd is not itself authorised to conduct investment business, so in order to have access to these pre-investment opportunities Investors, again securely and confidentially, have to go through any properly authorised Introducer's website.

Proof of Concept funds are introduced by means of 'Cancellable Transferable Loans which carry Investment Rights'. Investors do not receive shares in the Project at this stage, but do get priority rights to subscribe to the next stage. As it is very possible that an opportunity will come up against a fatal flaw before all funds have been committed, all residual funds in a failed project are returned to Investors as partial repayment of their 'cancellable' loan. In this way, the downside for Investors is reduced even further.

The rewards in successful projects are shared equally according to a 'rule of thumb' used traditionally in Business Angel investing where there is no realistic business valuation possible: it's transparent and as fair as possible. But these shares are between roles, not people. It is very possible – perhaps even common – that some people will qualify in different roles. This means that the investor who partially manages an opportunity, or the manager who puts in some money too, will qualify in more than one share. In this way, individuals can sometimes get more than a thirty percent share of the equity.

In addition, microFunding Ltd takes a 2½% stake in the emerging business, with up to three Introducers also being entitled to a further 1% each. Up to 4½% of the shares are retained in the form of options for contingencies, but neither the introducers' nor the contingency options may ultimately all be issued.

If the project fails, the loss is total but small; if the project succeeds, the same investors have a 'Call Option' to fund the ensuing business with unlimited upside. The 'Call Option' is saleable if for any reason an investor chooses not to take it up himself.

Alternatively if the project succeeds, the manager may find that product licensing provides a better route to profits. In this case, where both manager and investor risk less, the default position is that the inventor retains half of the project before the balance is equally split.

microFunding in the Future

microFunding was founded in 2008, and has an impressive successful conversion rate of raw ideas into proto-businesses. Over 3½% of all ideas posted have been converted by managers into proto-businesses, with a further 28% of ideas generating significant interest. Several of the ideas posted have even prompted competition among managers vying to be the ones to take on the business. Bear in mind that not one of these would have happened without microFunding, they were all in the 98% that did not get past basic investment criteria.

Investment Opportunities and Angel Networks

by Eileen Modral, Oxford Investments Opportunity Network

What constitutes an Investment Opportunity is a very subjective question. For the angel networks that I manage, this means a potential high growth company that is looking to bring a return for the founders and investors in an expected time period. Raising funding is not an exact science and often goes on 'gut feeling' and personal chemistry between the parties.

Companies usually start up with funding from friends, family and the ubiquitous fools (FFF). Venture Capitalists (VCs) usually don't invest less than £2m in companies, so Business Angels fill the 'funding gap' between FFF and VCs. They are private individuals looking to invest their personal funds in small, early stage, potentially high-growth businesses.

They can also provide important further benefits in terms of industry knowledge, contacts, management support and experience. Many are successful entrepreneurs themselves and have made money by selling their own businesses. Some however prefer to invest on a more passive basis and may be a serial investor with a portfolio of companies. Typically they invest amounts ranging from £10,000 and £100,000 and may invest as a syndicate (a group of business angels).

Angel investors do exist…and businesses are trying to find them, but how do they connect? The usual way is by networking, going to events, conferences, using personal recommendations and such like, and often companies will eventually find a few investors to talk to. However, communication between the parties can be nightmarish and some businesses never meet the right investors and vice versa.

The solution is to bring them together, to concentrate the parties in one place and to streamline the communications. Herein lies the reason for Investment Networks. How successful the networks are is often reliant on how successful they are at matching companies to suit the needs of their investors. In essence, how successful they are in finding the right investment opportunity.

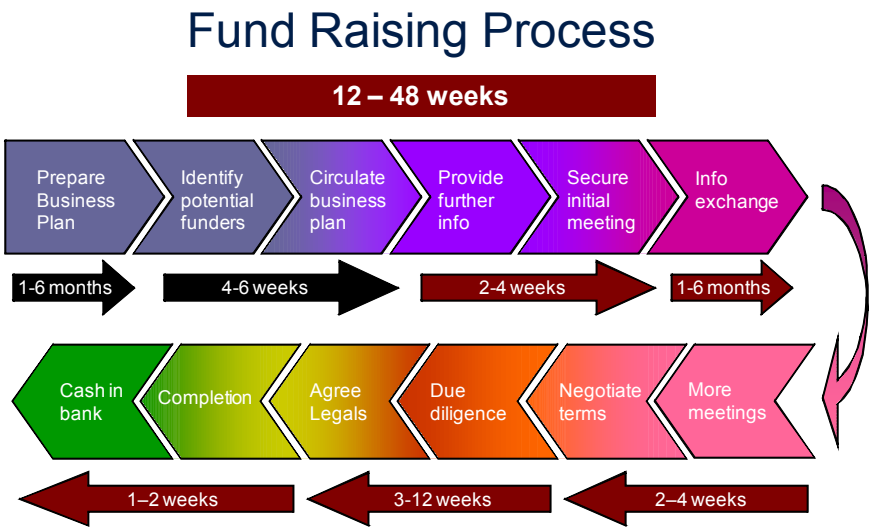
The main facts to remember for a business looking to raise angel funding is that:

- All investors are looking to get a return on their investment that is proportionate to the risks involved.
- Investing in early stage businesses is a high risk – high reward proposition.
- Investors invest in start-up exponential growth businesses.
- Early stage investors fund the period during which value is zero or negative and have little or no chance of getting any money back during this period.
- An investment is never complete until cash is in the bank.

The fundraising process takes time, whatever the opportunity. The usual time from pitch to funding is usually 3–6 months. It has been done in less on the odd occasion, but more often it takes longer.

Business Angels often look to lower their risk by a portfolio approach to their investments. The failures can be offset by those that grow, but the real interest is in those one or two that have the potential to give spectacular return.

Business Angels are a serious source of funding to the Entrepreneur. Business Angels invest as a High Net Worth (HNW) or Sophisticated Investor. They will normally allow 5–10% of their assets in unquoted early stage ventures. However, for any early stage investment a Business Angel will need to seriously think about follow-on funding, or allow investment dilution by other later stage investors or even loss of the investment through liquidation of the company.



A main issue for investors is dissuading the Entrepreneur they are not a threat to them and are not looking to take control. As a minority shareholder they will expect some safeguards but can bring more than just money.

The investor will usually have mechanisms to protect their investment under corporate control structures (e.g. shareholder or board ownership arrangements) but the day to day management control is with the directors of the business.

"Horses for Courses" – When to go to angels and when to VCs for funding? The difference between Angel Investors and VCs and the way they look at opportunities is more than just the stage of investment. Angels invariably invest with their hearts and VCs with their heads. The following is a guideline for these differences:

Angel Investors	**VCs**
Investing their own money gives flexibility	Investing from a fund of other peoples money
No one to justify investment decisions to	Investment committees, auditors, investors, peers
Can accept greater identified risks	Generally need to mitigate identified risk
Benefit from significant tax breaks	Rarely benefit from any fiscal incentives
No need to make investments	Are paid to make investments
Can provide specialist skills and experience	Provide general commercial business skills
Less capital available	Usually have deeper pockets

7 Making Prototypes – an activity which feeds back into improved design

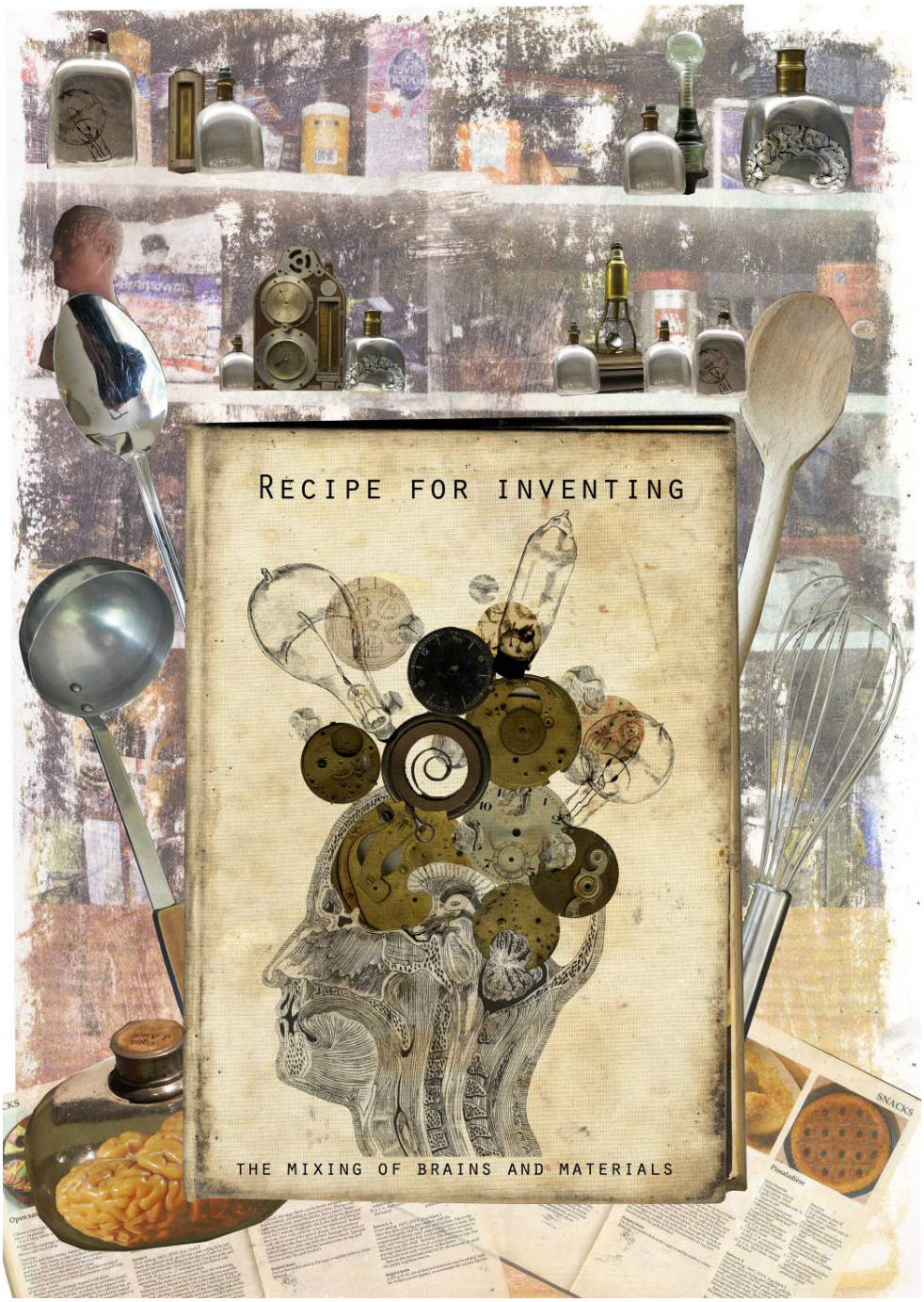
If a picture can tell a thousand words, then a working prototype and scale model will tell a million. Expressing your idea clearly to non-technical investors is a real battle, but a working prototype will win them over. Accompanied by a robust and practical business plan and strong IPR, a working prototype will improve your chances of raising funding considerably.

Engineering Product Design & Development for the Inventor
by Mark Newland BSc(Hons), Eur Ing, CEng, FIMechE,
Director of Abraham Associates Ltd

A company I worked for after graduating had previously had one product that failed disastrously. It is a classic tale of poor market research and lack of product testing for a new product. The company decided to produce a new product for the Muslim market in the early 1980s and was called the 'Mecca detector'.

The 'Mecca Detector'

It was intended to aid prayer by indicating the direction to face Mecca anywhere in the world. A good market one would think. However, the poor market research and product testing were to be its undoing. After many had been manufactured at great cost with its highly polished black case and Koran inscribed gold plated surround, it was found that the detector did not point to Mecca and was not economically viable to correct, worse still, the packaging that included a purple velvet bag was a huge faux-pas as purple is associated with death and mourning in Muslim culture. Needless to say that none were sold and 50,000 Mecca Detectors ended up as scrap.



Inventing is the mixing of brains and materials. The more brains you use, the less materials you need. Charles F. Kettering

I am often approached by inventors to help develop their ideas/products. Common problems are:

1. Unworkable strict secrecy (not necessary if the right precautions and procedures are used).
2. Insufficient funds for development, mainly due to a lack of understanding on how much it costs to develop products.
3. Have run out of funds by pursuing their idea without appropriate advice and assistance.
4. Trying to get free consultancy through drawn out enquiries and requests for quotes etc.
5. Inexperience in engineering, manufacturing, product design and a dogged determination to push ahead regardless of the obvious problems with the invention.

Compared to small to medium enterprises (SMEs) and large corporations, inventors are high risk customers and often pose a significant but sometimes a very rewarding challenge. Many are inexperienced in taking an idea to market, product design and development. It sometimes takes time and patience to take the inventor up a steep learning curve and for the inventor to appreciate what can and cannot be achieved in design and manufacture. By their very nature, inventors are strong willed and often do not take advice well that goes against what they want. This is good to get ideas started, but in development it is unlikely that the inventor will be able to do it all alone and will need to work with industry professionals and use their experience to avoid making costly and time consuming mistakes.

I am not deriding the inventor in the above comments, but hope to set out how inventors can significantly help themselves and improve the chances of their idea becoming a success by being better prepared and conducting themselves professionally when coming to Product Development. Having a good business partner and backing will greatly help the inventor achieve success. Lessons can be learnt from larger companies that have existing products or are developing a new one, usually, they know the process, have prepared well before development starts and are prepared to listen to advice. Also, a larger company product has a more impartial involvement with its owners and staff. With the inventor, it's personal.

Taking an idea or invention to successful commercialisation is not an easy one – there is no guarantee of success and it can take a lot of time and money even for a relatively simple product. Keep one sobering thought in mind, about 95% of all products that start development fail to get to market and make a profit. However, with a few simple and free initial steps, a lot of problems can be avoided along with saved time and money.

Ways to start

There are many ways to start the product design and development process. You may have the invention background established but need a good quality prototype to sell the idea to potential backers and customers. In this case, you may need to engage the services of a design engineer and supplier to produce the first prototype(s). Alternatively and preferably you will have been working on your invention for some time and have done enough research and work to prove that you have a good and viable idea. Some proof of this will be that you will have been able to attract a business partner and/or backing to pursue development. A good business partner can act as a valuable mentor and moderator when decisions have to be made at meetings and key reviews.

Having a very clear brief of what the invention is and what features it has to possess in order to work is vital. There is no point in entering development with a poor and weak conception of the invention's design scope. This will only lead to "design creep" where endless design changes are made as features are added and removed thus increasing cost beyond what was originally quoted, possibly compromising the product and causing delays. So a clear specification is required and can be in the form of a full specification with research data or a simple list of requirements ranked in order of priority:

1. Critical requirements – without these the invention would not work.
2. Nice to have – invention will work without these but there may be a benefit in having these such as aesthetics, performance, user comfort or ease of use etc.

The more thorough the specification the easier it will be for design engineers and manufacturers to quote and work to.

A design process

I say a design process, because there are many permutations determined by the invention and product design. There may also be several iterative loops going through the same processes until a desirable solution is reached. As an example, a seven step process is set out here:

1. Requirements (specification)
2. Design study (hand drawn sketches and research data)
3. 3D or 2D CAD (Computer Aided Design) design & simulation
4. Prototyping
5. Testing
6. Detail design (includes manufacturing drawings and data)
7. Manufacture

Design studies

Keep it simple or the 'KISS principle' (Keep It Simple Stupid).

Although the inventor may have copious sketches covering their invention's evolution and a physical prototype, it is well worth getting someone else to look at the invention from a professional engineering design and manufacturing perspective fairly early on. This is often difficult for the inventor as they will probably have lived with their invention for some considerable time and may not take kindly to someone else suggesting changes. This may be especially so if several or many prototypes have already been constructed by the inventor. For the product to evolve to a manufactured design, the inventor will have to let go to a certain extent and become less emotionally involved.

In the design study, significant design improvements and cost savings can be made. Something like 80% of all manufacturing costs are established at the early design stages, so it is important to get professional advice at this stage. Once a design study is complete, it should be reviewed and all should agree on the final concept to put forward for development. This may not always be clean cut, as problems may be found later on and another design study may be required on the problem area until a solution is found before development can continue.

Engineering Product Design

Engineering…to define rudely but not inaptly, is the art of doing that well with one dollar, which any bungler can do with two after a fashion. Arthur Mellen Wellington

The specification or requirement list is almost always a dynamic document and likely to change as the product develops so must be reviewed and kept up to date. A final design study and specification are used to guide design usually on a 3D CAD system operated by or overseen by a professionally qualified Design Engineer. Here, many iterations, permutations and simulations can be performed to check form, fit, function, aesthetics, strength and weight etc. without a single prototype having been made. A 3D CAD system does not replace the need for physical prototypes but makes those that are produced, much closer to the desired end result than by empirical or trial-and-error methods.

The design should be reviewed at regular and key intervals until complete. The 3D CAD data can then be used to obtain prototypes, detailed manufacturing drawings and documents. This data is the datum and vital for the products manufacture and must be thoroughly checked and proven via prototyping and testing.

Computer Aided Design (CAD)

There are many 2D & 3D CAD software suppliers and with the cost of software and adequate computer hardware reducing significantly in the last 10 years, it is easy to set up some way of drawing and modelling your design. Many may be tempted to have a go which is OK, so long as the potential problems in doing this are observed.

The preference is to use a 3D modelling system as this can simulate the real world more accurately and output 2D drawings along with many other 3D and data image formats. The computer overhead for 3D is higher than 2D. It is a mistake to try to use 3D software on an incorrectly specified computer. At best it will be very slow and at worst, not run or be prone to crashing and be almost impossible to get any work done. Usually, a 2D system is an electronic drawing board but with many smart productivity functions – great for layouts and schematics or something that is purely 2D or flat in nature. Some may have a form of limited 3D capability, they also cost less than 3D and are very much easier to use.

CAD is only a tool and being able to use it and even to use it well does not correlate to a good design that is cost effective, works and is manufacturable. This takes knowledge and experience. For the inventor using CAD, it will certainly help evolve a design and facilitate checking many scenarios without having to make as many physical prototypes, in effect "digital prototyping". However, without the right experience, there may be a lot of changes when it comes to development and design for manufacture. It is counter-productive for the inventor to develop the design too far. Pre-conceived ideas and problems can be designed in early on, only to be unravelled later during design for manufacture. So it is worth laying out the concept and developing it, then work with industry to take it forward.

For a product, the CAD data is its blueprint of reference or datum for manufacture, purchasing etc. It has to be prepared well, carefully, checked and maintained in a methodical way to keep it up-to-date. Professional assistance here is vital.

Engaging consultants

As the inventor is unlikely to be able to take on the whole product development process, industry professionals will have to be engaged. It is vital that good working relationships are established between inventor, design engineer and manufacturer. It is worth contacting at least three design engineers/ consultants for quotations. Design engineers and consultants are often connected to professional institutions such as the IMechE (Institution Of Mechanical Engineers) or IET (Institution of Engineering and Technology) and may be approached for contacts. Other sources may be government sponsored services such the Manufacturing Advisory Service (MAS). Also, do not forget personal recommendations from people or suppliers you know and search the Internet. Consultancies range a lot from the big and well known down to very small companies. Costs and expertise will also vary, so you will need to shop around to find what best suits your needs and budget. Once a Design Consultancy is selected, use their knowledge and experience to help find appropriate manufacturers and suppliers, it is very likely that they use and know good and reliable companies. The inventor will also need to have an NDA in place along with quotations and a contract before any work starts.

Prototyping – creating product data for prototyping manufacture & marketing

There are many prototyping and rapid prototyping processes currently available for plastics, metals, composites and ceramics. Rapid prototyping is often called 3D printing or Additive Manufacture (AM). Rapid prototyping processes include SLA (Selective Laser Assembly), SLS (Selective Laser Sintering), DMLS (Direct Metal Laser Sintering), Lasercusing, FDM (Fused Deposition Modelling), LOM (Layer Object Manufacture). Other prototyping methods include Vacuum Casting, CNC (Computer Numerical Control) machining, conventional model making etc. and are used as appropriate for product development. All rapid prototyping processes are additive layering operations built directly from 3D CAD data and material is built up in fine layers to create a prototype. Rapid prototyping requires no tooling (sometimes called Direct Digital Manufacture) and can produce parts in a matter of hours in plastics and metals – delivery is usually within a few days. These prototypes can be further enhanced by other secondary processes such as vacuum casting and investment casting for small batches of plastic parts or metal castings. Rapid prototyped parts can be used for functional testing visual and touchy-feely models to aid designers, toolmakers, customers and marketing.

There needs to be enough prototyping to adequately cover and prove out development. Prototypes are sometimes required at several stages during a project. This may vary from a single part for design validation or a small batch for product testing. Prototyping cost must be established at the project start as a balance has to be struck between prototyping and the risk of addressing problems later in the project when parts may have been tooled and are in production. It is well known that the cost of correcting a problem escalates as a project evolves. After tooling, it is many times that of correction at the prototype stage which in turn is many times that of a design stage correction.

Working with suppliers from prototype to manufacture

Use the knowledge and experience of your suppliers, design engineers and consultants. Engage them at the earliest possible stage in product development and reviews. Ask them to actively contribute and offer suggestions on better and cost effective manufacture, then many unnecessary costs and mistakes can be avoided. A lot of manufacturers and suppliers are very used to being told what is required (whether right or wrong) rather than being invited to contribute. With the right companies, the people within them are often professionals and good at what they do so do not miss the opportunity to involve them and ask for their advice.

Do not skimp on product prototyping, testing, trials etc. It is a common misconception not to test and prototype adequately due to limited funds, only to have to pay dearly later with expensive changes, scrap stock and work in progress, product recalls and warranty claims. It is not uncommon for budgets to be set inadequately for testing and prototyping but end up having to pay twice for their manufacturing tooling.

Building Cost-Effective Prototypes

by Jan Niklewicz, CEng, MIMech Eng., Managing Director, JNDC Ltd., Kingston

Leaving Kingston University's Engineering Faculty, principal lecturers Jan Niklewicz and Dean Carran set up JNDC Ltd, an engineering consultancy. The business quickly won projects solving problems to ease manufacturing and development processes within the aerospace industry.

Their offices are based in Kingston, only a stone's throw from the university, along with a large classroom used for training courses and a fully functional workshop including rapid prototype machines.

The company has diversified their engineering design talents to included designing and building prototypes for individuals as well as large organisations implementing the product development process. Working closely with the customer JNDC generate a step by step series of prototypes to progressively refine the initial ideas.

Their process works as follows:-

1) Initial Research – Firstly and most importantly – is there a need for your product concept? All new product development requires initial market research and work, they believe, from initial investigations into the size and value of the potential opportunity and into its required functionality a products success can be identified and valuable time and effort saved if the opportunity is not achievable.
2) At this point they ask some questions allowing the process to occur more effectively such as:-
   - How is the design different from others on the market?
   - What other products/services are there that are similar?
   - How large and who is the target market?
   - What would they be prepared to pay?
   - Are there any existing patents?
   - What does your target market think of the product?
   - Do you have the funds for this project?

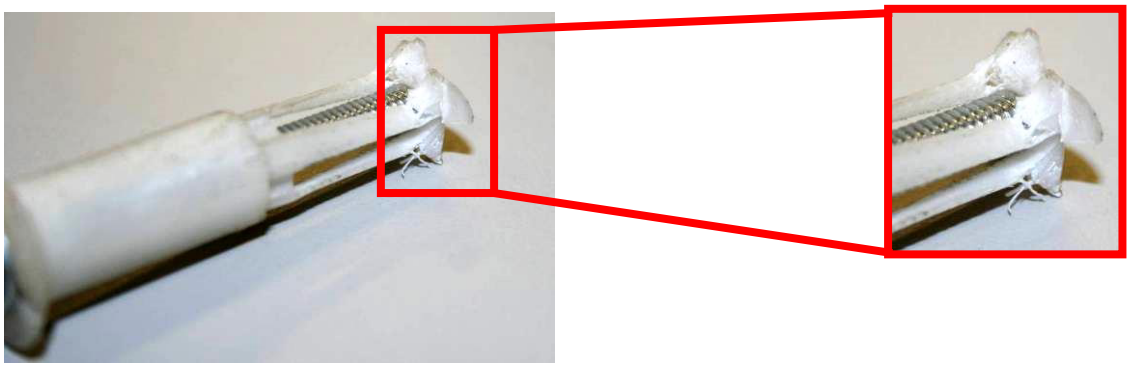
   As a working example of this process, taken from JNDC's portfolio they developed a single fastener for the aerospace industry to ease the manual installation of temporary ones. Here the initial idea was a problem solving engineering intent solution that would benefit efficiency and effectively. Original parts including rainbow fitting and installation in two parts requiring two workers to install and undo each fitting.

3) After initial brainstorming and research, a general concept design is achieved to give an understanding of the product. Several different concepts are developed that are presented virtually through photo realistic renderings, taking into account technical issues as well as ideas into the future manufacturing and material selection.

Photo Realistic Rendering of a Slave Fastener

Based on the detailed specifications a single fastener was developed that could offer both clamping and doweling properties, whilst also having an interface that a robotic system could support. The key innovation of the product being that the system could be inserted, clamped and removed in a one off movement.

4) At this stage a proof of concept prototype is produced. This initial proof of concept explores the basic size, look and feel of the product without simulating the actual function or exact visual appearance. A basic physical model is produced to display the key points and benefits. At this point the model identifies areas for further development and testing. Here the model is not designed for an end user or intended for internal decision making but for further assessment.



A basic physical model that was used for initial testing

At this point it is important to consider patenting your concept. It is important to remember that it is impossible to patent a concept or an idea only. A patentable invention must have technical features which therefore together are new and innovative. You do not need a finished product, however enough technical information that the product can be used or made. The patent will therefore act in preventing others from copying the concept and function of your design. This process can sometimes prove to be extremely costly and lengthy.

At this point it is also worth considering the option of selling or licensing your Intellectual Property as a license deal or taking the process the whole distance yourself and starting a business. There is a lot at stake and to consider, inventions can become very personal projects. Here JNDC suggest wearing a business cap and taking decisions from that point of view.

5) The first prototype validates the design concept. Here the model will be to full scale, suitable for further testing, market research trails and packaging mock ups. This stage may not provide the product in final material but explores options such as rapid prototyping to keep costs down. Detailed rendering, CAD models and drawings are also provided.

Maraging Steel prototypes used for further testing and analysis

6) The next step is to make a fully-functional scaled prototype. This simulates the final design, aesthetics, materials, strengths and functionality of the intended design. Here the model is made using advanced prototyping techniques and materials which replicate strength, colour and texture. This is also the last opportunity to make last minute improvements before production. This prototype is ideal for investor presentation and end user testing trials.

Final polished pre-production prototypes

7) The final stage is a production readiness report. This allows a confirmation of the manufacturability details that will be forwarded to potential manufacturers. All the details of the project are included with regards to tooling, packaging and manual designs. An identification of the supply chain management along with all drawings and technical information is included.

Now the really hard work starts and if all the background research and development has been completed successfully, you now need to sell your product. Whatever method you use be it websites, social networking sites, trade shows, exhibitions, advertisements, editorials etc. This is your time to shine and succeed.

8 Independent Testing of Prototypes – Crucial test results to show to investors

A working prototype accompanied by a Functional Test Report from an independent and reputable test house will help considerably in raising funding. However, early stage design advice from the test laboratory will also save the inventor money and time in the future, so that the design will work well and also conform to safety standards and international requirements.

Independent Test Results and Investors

by Alan Finn IEng FIET, Principal Consultant, FINN*biz* Consultants, Alton, Hampshire

A working prototype, accompanied by a report from an independent and reputable test house, will boost the inventors' chances of raising funding many times over. These can prove to be the two most crucial elements in raising finance. Drawings, even a video of the invention working on a test-rig, all help, but a working, proven prototype and unarguable test results will interest all investors who specialise in financing new developments in that particular technological area and marketplace.

I have seen a very clever inventor, with a fascinating, world-class invention, spend a lot of money to make a video of his invention working on a test-rig, with displays of its working characteristics. This was at a stage when the invention was not really fully-developed and the inventor was trying to achieve a short-cut to further investment. He took this video to several meetings with leading international players in his market (which was automotive) but, of course, his evidence was incomplete without independent corroboration. The meetings were difficult to arrange and once the video presentation had been made, and received in all cases with less than excited responses, it was very difficult to achieve further meetings. You get just one good chance and it must not be blown!

It is far more important to develop the invention to a point at which a working prototype, which must look as near in appearance to the finished product as reasonably possible, to impress non-technical investors, can be independently tested. The test-report by independent experts, if favourable, will provide unshakeable proof that the product works and that the desired benefits will accrue.

Investors are frequently grouped into three levels. Each one being roughly appropriate to the different stages of the development of a new product or invention. These are:-

1. "**High Net Worth Individuals**" (HNWIs) – these are groups of wealthy people who club together to make relatively small individual investments which can add up to considerable sums in total. They will demand a high proportion of equity because this investment is usually at an early-stage, pre-revenue and so perceived as high risk. They will invest up to circa £250k as a group and will want a clear and early exit plan.
2. "**Business Angels**" (BAs) – these are individuals and groups who will invest slightly more money at usually a later stage, for example, once trading has begun and the perceived risk is less. Their investment band is from about £250k up to £1 million.
3. "**Venture Capitalists**" (VCs) – will invest at £1M+ once profitable trading is evident and in order to take the business to the next level. They will often participate in management.

However, the first stage of an invention is often funded from the personal savings the inventor and his/her "friends and family". This source can support the development through to the stage of independent testing of a working prototype. From that point on, the alternative routes to market can be summarised as:-

- **Licensing** – selling a stake in the IPR for a one-off lump sum, the "Licensing Fee", and for an on-going royalty which is a percentage of the factory gate price (not the final retail price).
- **Manufacturing** – which can be by Joint Venture (JV) or a partnership in some form, perhaps taking the manufacturing process "off shore", out of your own, direct control.

Note that the level of personal involvement and complexity increase considerably with the manufacturing option, but so also does the potential profit. However, many believe that we each have only one lifetime!

But the manufacturing option requires funding – and lots of it. This is where the need for significant investment comes into play. Business Angels will consider "pre-revenue" investments, investments made before the product is manufactured and ready for sale, but will demand a large a large percentage share in return. (>50%). This is because, in their evaluation, the risks are high that the invention will not achieve commercial success quickly.

However, a lower percentage share may be negotiable if the risk is perceived to be lower and the way to achieve this is by developing a working prototype and have a reputable, independent test-laboratory to test it and to write a report on the results. If good, flaunt it! (But you will be made well aware that the invention is good or otherwise as the working prototype is developed!)

The Benefits of Independent Safety Testing

by Morten R. Pedersen, Senior Business Manager, Intertek Testing & Certification.

The basic principle of CE marking for product safety is "self-certification", to reduce barriers to market entry and to free up trade. Certainly, under the "Low Voltage Directive", the standard most commonly applied to electrical products, self-certification is the method used. However, it is still very useful to consult an independent expert product safety body at the earliest stage of development. This approach can save much time and wasted effort over the whole of the new product development cycle.

If you take the early design – even at the "sketches on the back of a fag packet" stage – into discussion with a selected independent safety testing and certification body, under a non-disclosure agreement, then their advice will help the development of the structure of the product in ways which will ensure that it will meet the relevant product standards (ISO/EN) – see Chapter 11.

If this early step is not taken and the development proceeds in such a way as to compromise the relevant standards, then it will make the writing of the Technical File, necessary to support the CE Marking, a very much more difficult business.

Or, if independent testing is mandated for that product area by the principles underpinning CE Marking, then the product will fail.

Either way, £[(time) + (effort)] = money wasted. The product will have to be redesigned to meet the appropriate standards. Frequently, interpretation of the standards is key to success. The expert for that standard from the independent product safety body, can often advise ways around an apparent impasse in your design, saving you much time and money and giving you more confidence in your new product.

If it is true that "a picture tells a thousand words", to explain a complex product to an investor, imagine the impression that a working prototype, complete with a test report from an independent and reputable safety testing laboratory, can have on prospective investors? It will increase the investor's level of confidence in your product – and in you, as a businessman – very significantly because, for the investor, it reduces the apparent risk.

And risk reduction is what all investors seek!

9 Bringing Inventions to Market – Doing it alone, manufacturing, JVs, franchising

Doing it alone is NOT the only way to bring inventions to markets. However, it is the most expensive and time-consuming method though…. Life is so short, lest we forget….

Have you considered Manufacturing with Partners
and Joint Ventures or even Franchising out your invention?
By Alan Finn, WRTI member

I worked part-time for three and a half years with Kingston University's "Enterprise Exchange" (KUEE) in SW London as an independent consultant. KUEE had established itself as an organisation, a part of the University, which focused on helping inventors, mostly but not exclusively external to the University, to successfully commercialise their ideas.

During that period, I managed about thirty or so different inventors' projects but could only help one of them to real success.

There were many reasons for this rather low success rate but a very few are salient and reoccurred time after time. It is very worthwhile to examine them for the lessons they bring.

One of the prime reasons for the low success rate was the deep conviction of many of the inventors that the only road to success open to them was by "doing it all yourself". Trying to manufacture in the garden shed" and attempting to use direct selling techniques by their own efforts usually led quickly to bitter disappointment and to fast rising debts.

All the inventor-clients said that they came to KUEE for assistance in bringing their ideas to market. However, what they really meant was "assistance in getting money" to fund their ideas and to then try to exploit them in their own ways, really believing, in fact, that the only barrier to success was funding and that they knew how to bring their ideas to market successfully if only they could be funded first.

I have met several inventors of middle-years, who had no prior experience of new product development processes or of marketing, yet who have gambled their houses, marriages and careers in trying to take their inventions to market by themselves, rejecting even free professional advice and assistance.

Why? Several factors come into play. I guess, first of all, that it is an exciting ride. However, at the core, I believe there is a deep-seated belief that the technical specification and development work is "the difficult bit" and that anyone can bring a good invention to market. "There'll be beating down my door for this and I'll be selling millions" is a phrase I have heard many times and came to dread. If marketing is so easy, there would be many more millionaires in the world today.

Free and professional advice and guidance is available online and from government organisations. You lose nothing by listening and can gain everything by using and implementing it – keeping your house and marriage.

Ways of lowering the risk include Manufacturing with Partners and Joint Ventures or Franchising out the invention.

Contract manufacturing is a form of outsourcing – you can outsource the manufacturing of your invention to professionals. There are many contract manufacturers in mechanical and electronic engineering. "Googling" "contract manufacturing" yielded 23,800,000 entries for exploration.

Joint Ventures (JVs) share the risks involved in the development of the invention. You will need to research and find partners who will share the equity. In return they will want some control of the management of the project but agree to share expenses, sales revenues and the investments required. There are variations such as "JVs limited by guarantee" and "JVs limited by guarantee with partners holding shares". "Googling" "Joint Ventures" yielded 14,500,000 entries and a little research here will help you to explore this option.

Franchising your invention out can work if it is a replicable process or business model eg innovative way to make new foods such as ice creams. If you have developed a machine which is the core of the production process, and for which you hold defensible IP, then the machines and process of production can be franchised out. Many countries regulate or influence franchising in some way to prevent abuse of this process. Once again it is worth exploring this option further and "Googling" "Franchising" yielded 9,390,000 entries for you to check out.

10 Bringing Inventions to Market – Licensing

"60% of success is worth much more than 100% of failure". We have a lot to try to pack into our brief and fleeting lives. Developing all the knowledge, skills and experiences necessary to bring inventions successfully to market can easily take up a couple of lifetimes! Why not delegate these activities to specialist experts, just as we do with lawyers, doctors, dentists and builders?

Have you considered licensing out your invention?

by Alan Finn, WRTI member

Bringing products to market by licensing out your IPR may be co-ordinated through the Institute of International Licensing Practitioners, who are based in the UK. For a small fee, they will offer your product to the whole database of their members, all professional licensing practitioners and agents, These organisations will then bid for your business.

They will often require payment by fees chargeable on a daily-rate basis. However, payment based on success is possible. On this model, a licensing agent will take 40% of all revenues received from licensing deals he makes on your behalf with buyers who will license your IPR and take the product to market. They are often large manufacturing companies who specialise in the area which the invention addresses but with whom the lone inventor's chances of making contact, as an individual, are quite remote.

The licensing fee structure is often two-fold. First, the licensing agent will attempt to negotiate on your behalf a one-off "licensing fee" which could lie between £10k and £100k, depending upon the product and the market. Then they will negotiate a royalty fee, typically 5% of the factory gate price (NOT the retail price), which is then paid into the inventor's bank account on a continuing basis for the remaining life of the IPR. And the licensing agent will police those payments for you because he wants his agreed percentage of them. A license deal is usually limited by time, geography, markets or volumes, but it allows the inventors to get on with life – and their next invention!

Why spend a lot of your own time and money to bring your invention to market, let an expert do that while you get on with your next invention!

by Colin Cramphorn, Managing Director of Inventions UK and Chairman of the Institute of International Licensing Practitioners

The temptation is to assume that your idea is so good that it will sell its self. But reality is very different. Even level headed inventors with commercial experience underestimate the problems involved. My own assessment is that Licensing is a much safer route to market for 99.9% of inventors.

There are of course many well-known success stories with inventors going it alone but these are the exception and you need to examine what really lies behind their success. Money, experience, contacts, family background, education etc are all important but drive and a determination to succeed whatever the cost is what really makes the difference. I have seen so many situations occur where reasonable sensible, well educated and well off inventors have failed. I have had inventors in despair ask for help having already spent vast amounts of money; in one case £440,000 and an eviction case looming on his home. We managed to find a licensee on this occasion and save his home but not without some difficulty as the inventor's objective was to find further investment, another £400,000. In another case the inventor sold his house and moved his family into rented accommodation so that he could invest the money in tooling. He was successful and went on to create a business but how many inventors are prepared to take that level of risk?

The other problem is the time that it takes to take an embryonic idea to market. The development and production cycle are the easy part, finding a route to market can be almost impossible. Most of the companies involved in the supply chain will have had experience of dealing with private inventors and small start-up companies – generally bad experiences – so this is a major issue and one that can also impact on start-ups and licensing if the inventor is involved.

An executive of a well known company stated that he would only deal with my company if we guaranteed not to ever take an inventor across the threshold of their premises.

Using experienced Licensing Practitioners offers the majority of private inventors and SMEs the best chance of success but care is needed as there have been so many companies offering to help that have no real expertise and little or no interest in licensing. Their sole interest appears to be to charge excessive fees. So care is needed when selecting a Practitioner to work with. Selecting one that is regulated by the Institute of International Licensing Practitioners is a good indicator. It is important that you meet with your practitioner and agree both a plan and suitable terms. Remember that the objective is to licence the IP and whilst market research, good graphics, prototypes, patents etc are all important they are tools to achieve a sale and not objectives in their own right! So agree a plan of action with your practitioner at an early stage and before too much money is wasted on ill-timed or unnecessary work.

11 CE Marking – ensuring your design conforms to standards & is manufacturable

The CE marking process is best begun at the very earliest stages of product design and not left too late when amendments to the engineering design to meet international standards can prove fatally expensive. CE marking is all about safety standards, conformity with international norms and manufacturablility.

Begin the Process of CE marking and safety certification early to save time and cost later on

by Morten R. Pedersen, Senior Business Manager, Intertek Testing & Certification

CE Marking is, under the CE Marking Directives most commonly applicable to inventions and products, a process of "self-certification", an example being under the "Low Voltage Directive" (LVD), which applies to electrical products powered in the voltage range of between 50 and 1000 V A.C. and between 75 and 1500 V D.C.

The process of self-certification, under the LVD, involves the writing of a "Technical File" which should include the design data for the product and a description of the design with respect to the appropriate EN standards used.

If a product is designed, a working prototype built and a CE-marking Technical File is written, all without realising that the appropriate EN standard has been wrongly applied, a huge amount of time, energy and money has been wasted.

A product can be bought by a Trading Standards Officer, in a UK retail environment, inspected and its Technical File checked by request to the manufacturer and is rejected. The whole investment in time and tooling can be wasted because Trading Standards may demand and monitor a product recall.

Approaching CE-marking and safety certification

by Alan Finn, IEng, Fellow of the Institute of Engineering and Technology

CE-marking is most often viewed, by inventors and those developing new products, as a necessary evil and a legal and financial obstacle to be overcome. It is often argued that CE-marking seems to be an obstructive barrier to trade and yet the whole process was conceived to be the antithesis of such problems which had previously, commonly existed. There is some on-going discussion about exactly what the symbol CE stands for but "Conformité Européenne" (French for "European Conformity") is the most commonly accepted response.

Before 1985, many individual European countries evaluated product safety to their own standards and this began to be seen as a barrier to trade and the free movement of goods between European countries. New Approach product safety directives began to be introduced across Europe by the European Parliament. These directives must be enacted into the country laws of EC member states within a certain period of time, and follow the spirit and focus of the directive.

CE–marking is often achieved by self-certification. For example, many inventions will commonly come under the Low Voltage Directive (LVD) which applies to all electrical equipment using voltages of between 50-1000 VAC or 75-1500 VDC and can be achieved by self-certification – see: www.cemark.co.uk.

The process of self-certification requires the writing of a Technical File, to record all the details of the product's design, including to which European safety standard (EN) it has been designed. The Technical File must be accompanied by a Declaration of Conformity, to declare conformity to the appropriate safety standard.

However, if the process of CE-marking is not managed properly and the product developed does not conform to the appropriate European safety standards, the product manufacturer may become the subject of prosecution under Product Liability legislation and criminal and/or civil legal proceedings. In particular, damages under a civil action can prove to be very expensive.

A simple precaution, taking some initial advisory consultancy from a specialist agency or independent safety-testing and certification agency, can provide that life-extending "sleep-at-night" factor and guide you to develop a safe product which conforms to the relevant ENs and which can be legally sold in European countries.

However, some have voiced the opinion that CE marking is applied unevenly across the EU and there have always been uncertainties about exactly what information should be included in the Declaration of Conformity. And so the European Commission has published "The New Legislative Framework", in an attempt to clear up this confusion. The greatest responsibility still lies with the manufacturer, to ensure the CE mark is correctly affixed and that the technical documentation is correct and available. Probably, the new "Framework" will make things a little easier for those newcomers to CE marking!

It is worth noting that other countries and trading blocks have similar, but different processes for product safety. In the USA, different standards and agencies exist, as they do in Russia, China and many internationally-active importing and exporting countries. The situation can be complex but agencies exist to advise on this, for example, see: www.intertek-cb.com/aboutus.

CE marking from a practical perspective

by Howard Clarke, CEng, Fellow of the Institute of Engineering and Technology,
Research Director of Morgan Innovation and Technology Ltd, Petersfield

Twenty or thirty years ago, when inventing or designing a device or process, most of the effort was spent in the actual technical aspects of the invention and its IP protection, but nowadays the balance has changed and now significant effort is required in producing all the documentation that is needed to ensure the design meets all the necessary regulations.

Regulation includes conforming to all the relevant standards and European Directives so that the product can be given a CE mark and be sold throughout the European Union. Whilst not applicable in the United States the disciplines and documentation required for CE Marking also assists if FDA (Federal Drug Administration) Approval is required and sought.

Instinctively most engineers are technically minded and so copious paper and form filling are not something that come naturally nor is it thought to be as essential or rewarding as designing and developing new products. However if information is gathered regularly during the development and put into a large file, this can form the basis for the "Technical File" which is the essential requirement for all approvals.

Experience shows that creating and maintaining a draft file with specific sections throughout the design and development stages, can make the final approval process easier and in the end quicker. Examples of typical sections for a Technical File are:-

- General concepts of Design
- Rationale
- Block Diagram / Manuals
- Test Reports
- Declaration of Conformity

The items that should be placed in these sections would include:-

General concepts of Design

- A short summary statement about the overall concept or idea
- A full detailed description
- Any photographs or other literature which will make it easy for a third party to understand the principle of operation.

Rationale

- How the device works
- Rationale for any Critical Components (normally components associated with mains voltages – fuseholders/switches etc.) and why they were chosen
- Safety features relating to Mains Voltages, earthing etc.
- List of major critical/non critical components
- List of all components (Bill of Materials)
- Risk Analysis listing possible risks and their severity and likelihood of occurrence and how each risk has been mitigated either by design or by warnings and cautions in the instructions.

Block Diagrams/Manuals

- Block diagrams of the device
- Circuit Diagrams
- Design and Construction details
- Manuals/Booklets (containing Warnings and Cautions)
- Labelling details of the device/product

Test Reports

Any Reports showing testing of all or part of the product by yourself, a third party or a Test House. If you are testing in-house try to ensure the person testing the product is not the designer of the product. In most instances a manufacturer is allowed to test their own product without reference to a third party Test House.

Declaration of Conformity

This is a single sheet of paper which declares that your product meets the appropriate EU Directives and relevant standards (effectively meeting all the requirements). The Declaration has to be signed by the company.

Putting copies of designs / calculations / components lists, parts and meeting notes etc, into the relevant section is easier done as the design progresses, rather than try to gather all the information together at the end which can be even more time consuming and quite daunting.

Having a Draft Technical File is also extremely useful when discussing the device with outside bodies and organisations such as potential investors / Test Houses, as it shows that the project is being managed properly and that Approvals, Certification and CE Marking will be obtained in a timely manner.

It is important at an early stage to get a copy of the relevant standards that cover the invention /device being developed – this may not be as easy as it would appear, as certain standards cover specific devices (e.g. toasters, irons, lawn mowers) and others are more general e.g. Low Voltage Directives or the Medical 60601-1 and it is important to identify all the Standards and Directive which apply to the development.

The British Standards website lists all the relevant standards – however it can be difficult to identify those that are relevant because they have to be purchased before they can be examined. Standards are normally quite expensive and no one wants to purchase what is not required. Large Public Libraries carry most common standards and can get others, but sometimes a brief discussion with a Test House will give you a list of relevant ones.

It is more than likely that at some point a Test House will have to be involved for testing or approval purposes and so establishing a relationship early in the development can have a number of benefits, including some initial free advice and help throughout the process.

Standards are written to attempt to regulate a whole series of devices so not all clauses in a standard will necessarily be relevant to one particular invention / device – so when the correct standards have been identified reading through them and noting which clauses apply (Y), which don't apply (N) and which are Non Applicable (N/A) will clarify the work that needs to be done. This technique clearly identifies the relevant and irrelevant clauses. For those marked N or N/A the Test House will require cogent and reasoned arguments as to why.

If a relationship has been established with a Test House they may be prepared to release their check list for the standard, this again saves time and effort. It should be borne in mind Standards are fairly rigid documents and Test Houses tend to test to the letter. So if the Test House doesn't agree that a clause is unnecessary or wants to test for a clause that is considered not to apply or is not applicable then a Company must be prepared to argue the case by providing evidence to prove the argument; existing practice, predicated similar devices, physical evidence, records, results or even a 'why not' report from an existing practitioner.

In Standards there are often Cautions and Warnings – if they cannot actually be included on the outside of the device, the "book" symbol should be included on the product labelling on the device. This symbol means "read the manual". All relevant information must then be included in the manual.

The European Directives that apply to the product must be identified. There are more than 20 Directives each covering a range of products – the best approach is to look at the EU New Approach Directives to see which applies to the product. These Directives can be found in the Europa website www.ec.europa.eu/enterprise/policies/single-market-goods.

Each directive covering a product will specify whether an authorised third party (Notified Body) has to be involved in the conformity assessment procedure that is necessary for the product to be CE marked. If it does, the Technical File will have to be assessed and checked by the Notified Body. Most products do not require Notified Body involvement (which is an expensive route) but not using an external body should not be used as an excuse for not completing a full and proper Technical File.

All CE marked products are subject to surveillance, so once a product has been CE marked, there is always the chance that one of the Market Surveillance Authorities (who are responsible for CE marking enforcement in the UK) will want to check the product and the first thing they will request is a sight of the Technical File, which they will then check and assess.

The following bodies, amongst others, are responsible for CE marking enforcement in the UK:-

- Trading Standards Services
- The Health and Safety Executive
- The Medicines and Healthcare products Regulatory Agency
- The Vehicle Certification Agency
- The National Measurement Office

If an enforcement body finds a product does not meet CE marking requirements, they will often allow the manufacturer the opportunity to ensure it is correctly CE marked. Failure to comply with this will result in the product having to be taken off the market and the company may also be liable for a fine (or worse).

One section of the CE regulations relate to the minimum size of the lettering for the CE Symbol and various warnings and cautions permitted on the device and these regulations are enforced. It is advisable that the design is done at the design phase as it can be costly to conform later and having to alter the lettering may then change the "look" of the device to the User.

Generally for CE marking the letters must be at least 5 millimetres – unless a larger minimum dimension is specified in the relevant Directive. The design of the CE Mark is shown in below.

Other areas which can get overlooked are colours of controls / lettering (avoid red unless used for STOP or Emergency Stop) and it should be remembered if a programmable device (PEMS) is used there is a whole raft of other regulations covering safety / software etc.

If the device runs from a battery (Class 1) then safety regulation is straightforward. If it runs off a battery that can be charged off the mains and the device does not run when being charged then one set of regulations apply BUT if the device can be used or even worn when being charged, then the device will be considered as working from the mains and will have to conform to the Low Voltage Directive.

As a general warning don't add features that don't enhance the device but may make testing more onerous, extensive and expensive.

Finally where the product is CE marked there remains a requirement to keep the Technical File up to date – this will involve not only keeping a record of any design changes in the product but also noting any reports from the field (users, distributors etc.) and acting on this information to improve the product during its lifetime. This gathering and recording of information is often referred to as "Post Market Surveillance".

12 Marketing Communications & Publicity – Why? To whom? How?

Marketing Communications describes the processes by which products and services talk to the potential markets to generate sales. These activities consist of advertising, press and public relations, direct marketing by mail shots and e-mails, exhibiting at shows and all the means by which potential clients can learn about the benefits and features of the invention. The Internet has had a huge impact here and has made communications more available, measurable and cheaper. But they must be carefully researched and planned for economic effectiveness….

Some notes on marketing communications

by Mike Overy, WRTI member

It is much easier to achieve commercial success if an invention meets observed market demand rather than to try and develop a new market with your new invention. The whole development or invention cycle is greatly facilitated by holding a business 'sanity check' at each stage of the development.

The business 'sanity check'

Most people will need to cultivate their 'communication skills' to present their message clearly, including having a brief but well-honed 'elevator pitch'. Note that you are marketing both the product (the problem it solves, not what it does or how it does it) and yourself (a 'credible person' and not 'another hare-brained inventor').

The marketing approach should vary according to the phase of the product development:

1. "Secret" phase – finding and making contacts.
2. "Co-operative" phase – covered by NDAs, IP protection filed.
3. Public "development" phase – finding suppliers and distributors, and, when ready, generating advance publicity (customer pull).
4. Launch phase – marketing to suit logistics and cash flow considerations.

1. and 2. The "secret" and the "co-operative" phases can make good use of networking. Some useful sources are:
    - Inventors Clubs
    - Universities
    - Online Groups: Linkedin, Facebook, etc.
    - Local Groups: Business Clubs, Chambers of Commerce, etc.…

    And you may wish to seek help with these phases from:
    - Contacts
    - Mentor(s)
    - Business skills advisors
    - Investors
    - Potential partners, suppliers etc.
    - Publicity (timing important, you only really get one time slot to do it properly)

3. As an example of how to approach the more public "development" phase, first consider the best approach, taking in to account your experience (strengths and weaknesses), available finances, interests and objectives:
    - Do It Yourself (good for straightforward projects where you have the skills and funding).
    - Partner arrangement (good where you want to stay hands on, but need significant support from someone with complementary skills).
    - Use an outside agency (good where there is a compelling business case and strong IP), but take advice on your selection of an agency and acceptable terms.

4. The Launch Phase will need a business plan/budget and cash flow projection to determine the roll out rate and marketing approach. This phase needs a brand strategy and to build the brand develop some good approaches, perhaps using:
    - Stories
    - Case studies
    - Self-promotion (eg: James Dyson, Levi Roots, etc.)

With very limited available funding, an incremental approach may be needed, where margin from initial sales is used to fund sales growth. Good approaches are:

- Press Relations – PR is 'free' publicity but at a cost of your time.
- Viral Marketing – such as putting a compelling video on YouTube.
- Exhibitions and markets – make them either sector specific and/or in a specific geographical area.

For effective PR you ideally need good personal contacts in the media and a compelling message, usually one of human interest.

Reaching out to potential customers

by Alan Finn, FCIM, Chartered Marketer
and Fellow of the Chartered Institute of Marketing

The Internet has completely changed the face of "business-to-business" (B2B) and "business-to-consumer" (B2C) marketing communications over the last 20 years.

Means of professionally reaching out to potential customers from a company or business to another company or business, and those communications from businesses to consumers, now lie within the reach and budgets of SMEs and inventors and bring, particularly, the measurement of results into sharp focus.

Market research is no longer an arcane and specialist subject but one which is now second nature to all of us using Google as their home page. Paid-for advertising is migrating rapidly to websites and "Pay-per-click" and web-based, very measurable means to reach out directly to your potential customers. Bloggers and many others readily find and send out e-mails to the editors of printed or web-communications for low-cost PR. Even web-based "virtual exhibitions" are becoming well-established, making inroads into the numbers driving up and down the M6 to visit the NEC.

But, more than most other means of marketing communications ("marcomms"), "Direct Marketing" (DM) by e-mail and telemarketing, combined with the use of low-cost and yet sophisticated CRM ("Customer Relationship Management") databases, has changed forever the face of marcomms and mining for new business.

I work with a lot of SME clients who need help to grow their businesses. When "marketing" is first mentioned, in early conversations, almost inevitably and invariably, they say "Oh, I don't do much advertising, beyond the Yellow Pages". The perception of the term and activities of "marketing" have come to mean advertising to the majority of small business people, yet the term is so much broader than just that.

The steps to develop an effective Direct Marketing campaign are easily mastered and managed by the computer-equipped non-specialist. This is the way to approach companies to whom you wish to sell your products or services by a B2B Direct Marketing campaign and the steps can be summarised thus:-

- Define your markets and the profiles of your target customer-companies and their decision-makers – not so difficult to do on a scrap of paper.
- Research the targets and try a few calls to them to find out the details of their decision-makers – after a few calls, this becomes much less daunting than you may think. From this experience, develop a script for use in both telephone calls and in follow-up e-mails.

- Start a database of these targets, names, telephone numbers and e-mail addresses first in Microsoft Excel – this is cheap and quick and easily transferred later into a more sophisticated CRM in the form of CSV (Comma Separated Variables, comma delimited) files.
- Design a "sales pipeline" or "sales wheel" of the sequential Direct Marketing activities required to lead your targets to placing their first orders – and then repeat orders which are the result of building customer relationships. The major advantage of CRM is that it will drag your attention to the process when it requires you carry out DM tasks, such as making a call or sending an e-mail. The process becomes one, if handled diplomatically, politely and with stamina, which can only usually result in orders and the building of a long-term client base.

All of the above holds true provided the initial research has been good:-

- Have you researched what your target customers really want to buy (and not just what your family might think that customers want)?
- Have you produced this solution and tried out working prototypes on typical customers?
- Can the product be manufactured legally at the cost required to allow you to sell it profitably at the price at which the customers will pay?

If this research is robust, then you are ready to set up your DM campaign and get selling!

Marketing Communications

by Malcolm McLaren-Clark of McLaren Clark PR Consultancy, Pulborough

Getting your story across using PR

The first rule in telling your story to the outside world is to put yourself in your target's shoes. Unless you are James Dyson, just remember the chances are that editors of the media, in which you would like to be featured, will not know you from Adam, so your communication has to strike an immediate cord, as otherwise they will not read past the first couple of lines.

Editors are bombarded daily by companies and individuals wanting to get recognised because they are convinced that they have something unique, which can change the world! Editors get especially irritated when sent material that is completely irrelevant to their editorial focus. Not surprising, really, as they have to wade through hundreds of press releases each day and decide what is credible and of real value to their readers. Having done that, they are more likely to publish the ones that need the minimum or, even better, no rewriting. After all, would you continue to read a publication that included everything, regardless of how well it was written, whether the product worked or not, or was clearly pie in the sky?

When communicating with the media, nothing can be taken for granted, just because you know your subject inside out, it doesn't mean others do. You must avoid jargon at all costs, and explain everything clearly. By turning to a professional PR consultant, you can have your story translated into something that will not only catch editors' eyes, but it will be delivered by someone who the editors are likely to know, and whom they trust to provide reliable information. A good PR consultant will give you an honest opinion as to the prospects of coverage for your product, or service, and tell you if it does not stand a chance. Obvious questions will be: Exactly what do you have to offer? What is different, or revolutionary about your offering? What is the potential market and who will buy your product or service? What does it cost and where is it made? How does it work and what gave you the idea? Who are you and where are you based? Reasoned answers to these questions dramatically improve the chances of getting covered.

Before embarking on a PR campaign, it is, of course, essential to protect your Intellectual Property through a patent or copyright agreement. Once the word is out, it is too late to apply and you run the risk of your invention being hijacked by someone else with the ability to capitalise on it quickly.

Once you have the IP protection, you then have to consider whether, or not, to manufacture yourself; arrange for it to be made by someone else under a royalty agreement; or, to sell the idea lock, stock and barrel. If you decide to go it alone, then you have a 'Dragon's Den' situation in which you need to attract the necessary investment in order to take your plan forward. Any editor will want to know your plans in these respects to determine that you are serious and not just flying a kite.

Once you have satisfied all these pre-requisites, then PR can provide you with a powerful promotional tool, which, given the right treatment can spread your story like wildfire all through the media and make it the talk of the town, or possibly the world. Social media too will probably come into the mix, but a word of warning – don't start 'blowing the gaff' before taking everything else here on board.

For many years, I ran an event called the Young Electronic Designer Awards (YEDA), which encouraged contestants to invent and produce innovative and marketable ideas. There were some incredible projects, many of which succeeded in spawning new companies, coming to market, or in having the rights sold to established organisations. The reason for citing this is that one development in particular comes to mind, which gives a first class example of PR success: a sixteen year old aspiring engineer came up with a device, which can be fitted simply to ordinary trains to monitor the condition of railway tracks and alert the control centre in real time if any cracks, or other defects are noticed. This device obviates the need for lines to be closed during testing by special purpose vehicles. We released the story to the press and it went viral. The young man was pictured in all the national press, on television and in professional publications with the result that he was inundated with enquiries from railway companies all over the world. He set up his own company and the product is now fitted to trains in a number of countries.

PR is therefore, a powerful tool in getting you and your product known, but, and it's a big but, you have to make sure you have all your 'ducks in a row' first and then turn to the professionals who will make the most of your story.

13 Sales

Many inventors are, naturally enough, technically focused and selling their ideas and products to investors and to the marketplace is a new experience and, for many, quite anathema. Richard Little is the Managing Director of Andover-based Jenton International Ltd but early in his career he sold double-glazing for a period in which he experienced selling successfully at the cutting edge.

Selling the Invention

by Richard Little, Managing Director of Jenact Ltd. and Jenton International,
President of PPMA and former WRTI Chairman

Marketing is what you do to make the phone ring and sales is what you do when you pick up the phone. The more people who know about your invention, the more the phone will ring and the more customers you will get. Even better, the more people that are possible customers for you, that know about your invention, the more customers you will have. Targeting your activities to the latter will make life easier and is much more efficient.

Where possible, you must try to find out about and inform companies and individuals about your invention in cheaper ways. This will require creativity. How might they get the message?

Indirectly – How to make the phone ring.

- PR & advertising
- Exhibitions
- Exposure
- Social networking (very important) – LinkedIn for business, Facebook for individuals

Directly – Targeted

- Cold Calling
- Social Networking again
- Mailshots

At all times, separate efforts should go into websites, newsletters, PR, exhibitions and other general marketing activity to try to increase the awareness of your invention. Aim to make at least 25 contacts per week, on average, with self generated contacts. Each contact or company should be entered onto a sales database (CRM – a Customer Relationship Management software package, but you can start off with MS Excel), once it is established that future contact may be worthwhile. All entries to CRM must have e-mail addresses and telephone numbers and "next steps" required for action.

This need not be such an onerous task and will be worthwhile in the long run. All sales courses, managers and big companies rate prospecting as the best way of winning sales. In many cases, a cold call or two can fill the gap when one is prevented from getting on with one's main task because someone or perhaps some information has not arrived or for a million other reasons. Here are some 'cold calling' suggestions for isolating potential contacts.

- Find a directory list of companies in your industry/field.
- Inform them about your invention – always ask 'do you know anyone else who might be interested in this?
- Where you think that your invention would be appreciated.

Don't be afraid to hunt the customer:-

- At exhibitions, in magazines, using PR.
- By 'BRAD' a monthly directory that lists press publications and how much it costs to advertise in them.
- Using exhibition bulletins, using local media.
- By direct contact, in person, by mail, by phone.
- Using directories, by internet networking or using plain common sense.

Further suggestions are to:-

- Visit an exhibition where the exhibitors could be potential customers.
- Contact companies who sell complementary products to your invention and who may be able to introduce you to their customers.
- Ask people that you talk to if they know of others who may be interested.
- Visit a store where you can see products that you could contribute to and note and contact their suppliers.
- Drop in to the reception of companies you pass who look as though they might be relevant.

In addition, your client database on CRM is probably the potential source of many possible repeat sales. Scan/graze your CRM to be reminded about companies, to find companies in places you are already visiting to 'drop in on' and for regular 'warm calling'. Make them always think that you are the 'expert' to call if they need anything related to your specialist area. Whatever you do, follow up relentlessly. When are decision makers there? Bear in mind times when targets won't be 'protected' by their gatekeepers.

- Smile on the phone. Be cheeky.
- Find the right name, ask for it? If necessary, make a second call.
- Be ready to banter. Build credibility fast.
- When visiting, bear gifts, brochures, samples…
- Make an impression.

Each CRM entry should make clear:

- The source of the enquiry, together with all contact data.
- All quotation numbers.
- The line of business of the contact and all contact details.
- The "next step" required to progress to the closure of a sales relationship.

When exhibitions are involved, leads need to be marked as sourced from that exhibition when added to CRM. You should produce a report immediately the exhibition is over with comments and details of prospects from the show. This should be updated after the first month and quarterly thereafter.

There is no substitute for visiting a customer or potential customer, or possibly having them come to visit you, if you have operations to show off at your premises.

Building up a relationship with a potential customer makes them think of you first, makes discussions easier and if anything goes wrong makes sorting problems out more easy. They are human, if you find something in common that you'd both rather talk about, then fine. Take them out for lunch or even a chat over tea in their own canteen.

Visiting a customer allows you to see the application and problem that you are being asked to solve at first hand and allows you to fully assess the customer's requirements. It also allows you to check for issues that might bite you later and also to get a feel for the professionalism, technical back up and the conditions in which your invention may be expected to work. It is better to turn down some sales than go through heartache later.

More visits to potential customers = more sales. Take the time to find out about the whole of the customer's business and their core interests. Are they technical or marketing oriented, etc? Make sure they have information on what you do that relates to their needs and also what they might want later or elsewhere.

If you say you will send them something – do so. In all cases follow up with a 'thanks for your time' e-mail, with a note of "next steps agreed". Make sure details of other people you meet at a firm end up on your contacts' CRM database. Try and get them to commit to samples or to visit you for trial.

Take notes. Always take a tape measure. Ask what their budget is. Ask when they are expecting to order. Ask them to confirm that your invention will do what they want. Oh – and ask for the order. Directly is best.

The amount of money that you keep from a sale must be considered more important than the value of the sale, however dramatic it may sound at first. All prices should be set so that the minimum that you keep from the sale is a 33% margin. (Or a mark up of 1.5 on the total cost).

Discounts should be avoided wherever possible. If you think you will be asked for one, over-state the price first. Your price should be fair as it stands. Always try to give 'discounts in kind' before discounts in cash.

- Offer installation/training help.
- Offer materials/spares.

Always calculate the total cost of a job before quoting. Use an estimation sheet. If in doubt, ask. Include:

- Costs of main items
- Import duty
- Cost of freight and insurance
- Cost of any extra added parts (ie. rewiring to UK spec. etc.)
- Survey visit/measurement costs
- Design/drawing costs
- Costs of other smaller components (ie. hoses, exhaust fans, connectors)

In addition, for manufactured items:

- Raw materials
- Design/drawing costs
- Machining costs

- Assembly costs
- Software writing costs
- Labour

Contracting out should be done as much as possible. People who have spent their whole lives doing something, or who have companies that specialist in activities which you also carry out, may not prove very cost effective, leaving you to concentrate on your specialist activities. They carry some of the risk and your price is likely to be more accurate. Always leave provision for the unexpected! Do not consider that you have an order unless:

You have the customer's money.

or

You have a written order and are happy with their terms, conditions and specifications and they have paid an agreed deposit (if required).

or

They are a long standing customer that you have dealt with before and they have given you an order number and deposit is received, if appropriate.

Whatever happens, do not deliver an order until you have an order on paper or a deposit cheque. Are you satisfied with the customer's ability to pay? And do not accept an order unless you are absolutely sure that both the customer and you think you are supplying the same thing.

Understanding the problem – asking questions:

- Work for your customer.
- Ask "open" questions; 'outline' not 'why'.
- What is the end result that they want to achieve? (Triz).
- What's important to them – not you? (Honda), (laptop)
- What other options have they considered? Why did they fail?
- Don't suggest anything – yet. You are the consultant / expert.
- Look at it from your customer's point of view.

Always sell the solution:

- Be your customer's consultant.
- Calmly and simply explain that you can solve their problem.
- Explain how you intend to solve the problem. Try to use your own USPs.
- Gain their trust that you can do it.
- Avoid technical detail and let them ask.
- Be prepared to change tack and react to their signals.
- Follow their agenda (in your way).

Overcoming objections:

- Anticipate during preparation, (finance).
- Check frequently that they are happy.
- What's the real reason? – buyers are people and they can get embarrassed (authority/afford or nervous/reassure).
- Objections can be temporary. Are they just a sign of a lack of understanding or of a further information requirement?
- "If I…, then will you…?"
- Create objections for other people.

The Sale or 'Close':

- Gain agreement – loop if necessary.
- Don't be afraid to ask.
- Don't be afraid to discuss price.
- Double check details. Order form.
- Tell them they've made a good decision ("cognitive dissonance").
- Be excited for them.
- Say 'Thank-you'.
- Talk about something else.

Follow up the sale:

- Consolidate.
- Check details/specifications and requirements again.
- Ask for referrals.
- Investigate similar companies.
- "What else can I do for you?"
- Keep in touch – next birthday etc.…
- PR – write and get a case study published.
- Mention when networking in a related environment.

The notes above have been taken from lessons learned in studies and related experiences from the "school of hard knocks" – life. Inventors may believe that putting some of the suggestions listed above into practice requires a hard-nosed commercial capability that they just do not possess. However, if you really want to turn your invention into a commercial success, just try one or two. You will soon find that it is all much easier than you believed and that the hardest part was to think about doing some sales work before you actually began to do it!

Finding and Selling to potential customers

by Alan Finn, FCIM, Chartered Marketer
and Fellow of the Chartered Institute of Marketing.

Many inventors and small businesses, unused to the practical disciplines of marketing and sales, are unnerved at the thought of finding and then approaching potential customers. And yet, as enthusiastic inventors, they themselves are completely "sold" on the benefits of their invention to businesses and society. But without communicating those benefits and features, how else can it be sold?

The best way to solve this dilemma is to construct a simple matrix of benefits and features, as follows:-

Benefits	**Features**
"Solve the world's energy problems…"	"A perpetual motion machine…."
etc.…	etc.…

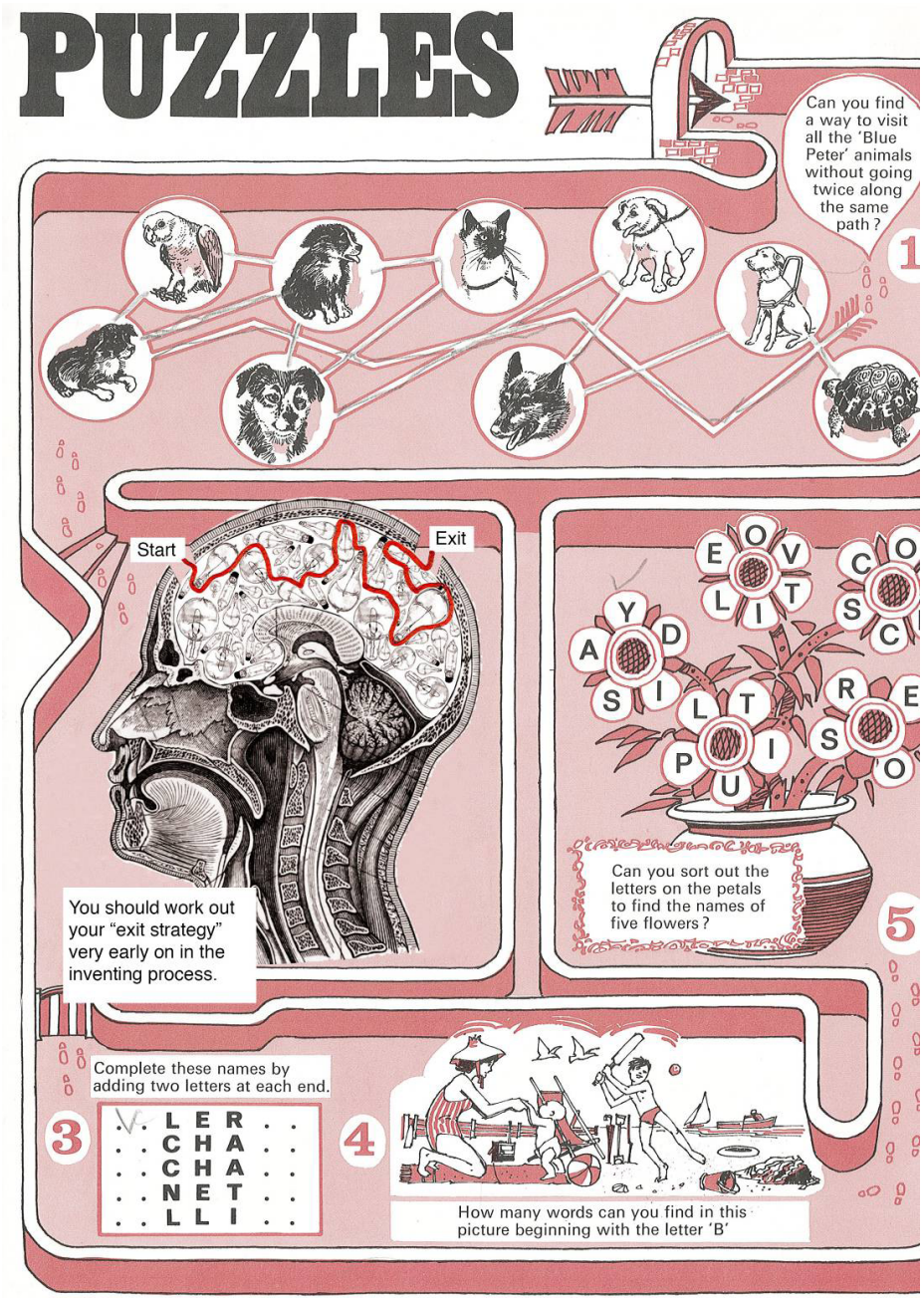
From this chart, it will become obvious to which section or segment of business or society the product should be aimed. Then research these points over the Internet and "break the ice" by making two or three calls to find and talk with potential customers, describing the benefits (and not the features, at first) of your product or service. Then check that your assumptions of their needs are indeed met by the benefits of your offering.

Develop an outline script from this experience, which will also assist with "stage fright". Then use the Direct Marketing (DM) sequence to pursue your carefully-researched targets and build your business. The DM sequence can be illustrated simply by the following steps:-

1. **Scripting**: work out in written script form what you want to get across to potential purchasers or partners. The script can be used for telephone calls, presentations and agendas for meetings. This is an important first step and at its core should be your "elevator speech" – how you would succinctly describe your proposition in the time it takes to ride in an elevator between floors in a building. It's a good discipline and you should aim for the minimum in word-count.
2. **The DM Action Pipeline**: work out what actions you are likely to need to take, in a repeatable sequence, to get and to hold your targets' interest. The responses are often described by the acronym AIDA, Awareness, Interest, Desire and Action. Typically, they start with cold telephone calls, using your script in 1.) above, to previously web-researched targets, in order to verify the contact details of the DMU, the Decision Making Unit, which could be one person or several. I like to start at the top and go for the Managing Director. If you gain his awareness, attention and interest by a subsequent and well-written e-mail, your message will go down and through his organisation, like the effects of gravity, with his implicit support to the level of the person to implement the reactions you require. The sequence of Actions in this DM Pipeline are usually, research, cold calls, e-mail, follow-up e-mail, call to your, by now, warm contact, set up a face-to-face meeting. By this point you should have a good idea of how well your proposition has been received and how to move it forward to closure – the sale!
3. **Gain First Meeting** – and feedback. The first face-to-face meetings are not usually sales meetings. You are still in information gathering mode and you should follow the old sales adage and use your facial orifices in the order in which birth provided them to you: two ears and one mouth. They will be interested and flattered and, usually, helpful if you explain that you are seeking their help in order to make your business proposition eventually more beneficial to them. And that is exactly what you should be doing.
4. **Make sales**: By now, the landscape will be entirely visible to you. Their needs and how your solution can meet them, the competition, the prices and the barriers and requirements in the supply chain. Then you need to win a trial order, over-fulfil it and gain a longer-term contract.

14 Knowing when to let go – achieving your life's goals

You should work out your 'exit strategy' very early on in the inventing process – how and when do you want to make use of your earnings from the invention to improve the quality of your life?



Your 'exit strategy'

What do I want from my invention?

by Alan Finn, Member, WRTI

The Exit Strategy which few inventors give any detailed thought about – about precisely what they want from their invention in their initial Business Plan. And yet the exit plan should affect the whole strategy.

For example, if you…

- Have been manufacturing and distributing your invention yourself, and own robust IPR, you could exit by licensing your IP to another organisation.
- Have been manufacturing and distributing your invention yourself, you could conduct a trade sale of your IP and your manufacturing operations and assets, your distribution and work in progress, selling up everything, perhaps to a leading competitor or a joint-venture partner.
- Have a good idea but have not really done anything with it, consult a licensing or patent agent, consolidate your IP, if possible and at the right time, and then license it out.
- Have a good idea and have consolidated your IP, then consider licensing it.

After struggling for some years to get your invention to market, and then to profit from it's development, it may be a very welcome thought that, to quote a well-known ex-BP executive, you could "get your life back" and enjoy the profits from exiting from your business by one of the means above.

And that does not confine itself to just selling up your business for whatever sum of money you may get for it. Having worked to make it a success, you will have developed a lot of very useful experiences which could be passed on to others in some of the following ways:-

- Write a book on your experiences – or, better yet – contribute to future editions of this book.
- Become a consultant to work with other inventors, perhaps with a university.
- Get on to the after-dinner-speaker circuit which can build another income stream for you and be lots of fun.
- Develop some other new product ideas. Having successfully come through the fire of the inventing cycle, the next time around could be much more successful, more quickly….

15 Further Reading

No one can or does know it all. There's lots of good stuff here for further reading:

- The WRTI website [www.wrti.org.uk] has links to hundreds of useful free resources.
- 'Will it Sell?' How to determine if your invention is profitably marketable by James E White.
- 'Differentiate or Die' by Jack Trout.
- 'The leaders guide to lateral thinking skills' by Paul Sloane.
- 'Different Thinking' creative strategies for developing the innovative business by Anja Foerster & Peter Kreuz.
- 'Blue Ocean Strategy' by W. Chan Kim & Renee Mauborgne.

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INNOVATION IN ACTION

See: www.wrti.co.uk

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16 Acknowledgements of Contributing Authors

The contributing authors, from the WRTI membership and specialists in subjects of deep interest to inventors, are all listed below, in no particular order, but the WRTI is deeply grateful for their very valued contributions to this book:-

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John has a background in Mechanical and Civil Engineering (structural theory) and has several patents in the area of automotive testing equipment. John is an enthusiastic woodworker and silversmith, and is now 'working in retirement' on a variety of inventions such as the "PostPlate" – an easily installed and maintained fence posting system. Contact John through the WRTI: www.wrti.co.uk

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Mr Colin Cramphorn, Director, Inventions UK, Chair of the Institute of International Licensing Practitioners and investor. With professional backing from Inventions UK , ideas can make money for inventors. Even with an idea with excellent market potential, it is a long journey from the first time an invention is sketched out to when a license is signed off. There are many variables involved in the development of an idea that are totally outside anybody's control. However, inventors should always be optimistic. People need new products and manufacturers need new ideas. See: http://www.inventionsuk.com/default.htm

In the experience of InventionsIP, SME businesses often do not need a full IP Audit. What SMEs often find most valuable is knowing that for certain. That's valuable information in its own right. Just as valuable as the information that you can expect if the scope of the IP warrants a full IP audit. If an SME has an extensive IP portfolio, it is likely that only a full IP Audit will provide the overview required. But if the SME is very small, InventionsIP may be able to get a business handle on your IP in one fell swoop, with a full IP Audit being unnecessary. See: http://www.ipaudituk.com/
Inventions UK and InventionsIP are also linked to a group of investors, Business Angels and VCs.

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Married with two adult children, Chris was Finance Director of a rapidly growing import company from 1978 to 1982, eventually successfully sold. He then founded a series of very successful Financial Services businesses, all sold in 2005. For eighteen years to 2006 he specialized in raising risk finance for early stage businesses with Beer & Partners, latterly being responsible for the Thames Valley region. He founded Equity Entrepreneur in 2005 to help address the lack of knowledge and understanding in and about the Business Angel market, and specifically to help Investors invest more successfully in entrepreneur businesses better prepared for investment. He has run highly acclaimed workshops for several Regional Development Agencies. He also founded microFunding, a web-based three way introduction platform to help make commercial success for inventors from their creativity, for managers from their business skills, and to provide investors with a volume of good quality deals. He has made several (modest) angel investments, some failed and one or two are doing fine. Please see: http://microfunding.wordpress.com/chris-clegg-and-his-founding-partners/

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