

‘PROS AND CONS’ OF RUNNING A SMALL TECHNICAL BUSINESS

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1. INTRODUCTION

I am not aiming today to give a view of how to run a small business. Rather, I am going to use my own experience to illustrate some of the attractions and problems I found. I hope this will be of some interest and will provoke (encourage) discussion.

I was made redundant from Linotype Paul here in Cheltenham in 1980. I was lucky, I got a job fairly quickly to take over running of a small University company, IDB, at University College of North Wales early in 1981. We had our problems and by late 1982 I had to reduce staff numbers – some returned to the University and some were made redundant. While this was realistic it was not considered good news, and it was suggested I should ‘consider my position’ – which I did! I faced a dilemma: the university wanted us to exploit ‘bright ideas’ arising from research at the University. I found few ideas that I judged exploitable. I recognized that entering a new market that you do not know and does not know you is slow and expensive - and may not be successful! I was therefore faced with a decision at a board meeting in the summer of 1983: do I continue to try to run the company to satisfy University wishes or leave and start my own company. I chose to leave and start my own business: John Chubb Instrumentation (JCI).

I had some background in electrostatics from my PhD work, from commercial consultancy work while I was at the UKAEA Culham Laboratory and from the IDB work at Bangor. From my experience at Bangor I felt confident I could develop a more user friendly and better performance handheld electrostatic measuring instrument than any then available. I felt that this would form the basis for a range of instrumentation – and hence a worthwhile but modest business. I expected that I would be able to continue electrostatic consultancy work. Having some money in the bank, full ownership of our house and no dependent family (apart from my wife) I felt I could survive the initial start-up costs with perhaps just overdraft support from the bank. I did not wish to seek investor funding as I wanted to run the business my way, not with the constraints and the need to maximize profits for others!

I started JCI in 1983 and ran it for just over 25 years – and I was able to sell it as a going concern early in 2009. While I guess most of us here are now beyond the age of starting and running a new business I thought it might interesting for me to describe, as I experienced it, the pros and cons of running a small technical business.

2. BACKGROUND

After a degree in Physics at Birmingham University and a PhD on behaviour of airborne particles during electrostatic precipitation (1958) I felt that I did not know much really of how the world worked so I did a graduate apprenticeship at English Electric in Stafford (heavy electrical engineering). I then lead development there of high power vacuum interrupters with the aim of being able to interrupt 10kA at 10kV – an objective we achieved! I joined the UKAEA Culham Laboratory (now the Culham Centre for Fusion Energy) in 1962 to investigate high speed condensation pumping of hydrogen on to sub-4.2 liquid helium cooled surfaces. In 1969 I joined the ‘diversification’ activities at Culham and ran a small group pursuing a variety of commercial projects. These included shipboard studies of electrostatic ignition hazards during tank washing on large crude oil tankers, development of a novel monitor for airborne asbestos fibres and exploration of large area computer typesetting.

I chose to leave Culham in 1978 and after 2 years at Linotype Paul here in Cheltenham I was made redundant. I was fortunate to have the opportunity to take over as managing director of the small University company in North Wales. I resigned from Bangor in 1983 and set up my own company, John Chubb Instrumentation.

3. START UP

I had about 6 months to prepare for my decision to leave Bangor. Official pressure was made apparent after I had to make a few of the staff redundant and return a few to the University. I used that time to plan how I thought I could get JCI started. We decided to base the operation of JCI in Cheltenham. I knew several people in Cheltenham who had also been made redundant from Linotype Paul soon after myself and who might well be available to be involved and provide technical support. Cheltenham also provided much better communications access to prospective customers and to manufacturing facilities. We would also be nearer to our families than in Llandudno.

I moved into ‘the premise’¹ (Unit 30, Lansdown Industrial Estate) in December 1983. (I use the term ‘premise’ because it was too small to be plural and it was basically a proposition!).

Once I had access to the premise I set up one of my large work surfaces from home for instrument build and test work and purchased necessary basic tools and test instrumentation. Luckily I was able to purchase, at very modest cost, a number of office desks and chairs and a full size drawing board and also a light box for tape layout of PCB electronic circuits. To avoid the need for secretarial help I purchased a Sirius computer (pre PC days!) and taught myself basic word

processing and spreadsheet operations. This enabled me to send out quotations and write letters and reports.

So by Christmas 1983 I had the basic facilities in place for running a business. That first Christmas was rather lonely in the premise!

4. PERSONNEL

When I started JCI I expected to get a good size consultancy project from the European Space Agency, so I looked for someone to work with me. However, a colleague from Culham days advised me not to employ anyone until I had the contract – wise advice, as the contract did not materialize! From ex-Linotype Paul contacts I found someone to help me with mechanical design work and someone else to help with electronic circuit design. These two people enabled us to get started on designing and building our first instrument well before I gained access to the premise. This first instrument took about 9 months to become a saleable reality.

As the business developed over the years I was able to get the assistance, in addition to the ex-LP people, of a couple of experienced electronics engineers (later a third) and a practical physicist with great software capabilities. I was also helped by some secretarial and bookkeeping assistance. I employed all these people as part time consultants paid by the hour for the hours claimed ('zero hours contracts'!!!). This arrangement provided access to skilled, experienced and well-motivated people when needed. (Flexibility was needed of course to accommodate wishes to play golf, etc). What this did mean of course is that I had to act as the glue to hold everything together! However, I was still able to have some holidays and spend time at conferences etc. It would not have been practical to offer full time employment to young qualified staff, as the work and skill requirements varied over time and it would not have been feasible to offer any career development prospects.

All the people involved in JCI showed great motivation and enthusiasm and it was a happy working environment. Yes, of course we experienced technical problems – but they were taken more as challenges than a cause for worry. Our enquirers and customers seemed to appreciate the opportunity to discuss their interests and we avoided pressing them commercially. The small size of JCI made it easy for us all to work together and share ideas. Being small and self-financing enabled us to quickly make decisions and respond to opportunities.

5. THE BUSINESS OF JCI

The main business of JCI was the manufacture of electrostatic measuring instruments. About 15% of the business was as electrostatic consultancy – on-

site and investigatory studies for customers. Exports were always a significant component and in the later years represented around 60% of turnover.

The business was not aimed, or expected, to become large or have a multi-million pound turnover. The aim was to do things that we felt were interesting and likely to be of benefit to users and by this to earn sufficient profit to be adequately self-financing. We basically restricted the business to instrumentation for measuring electrostatic features and developing appropriate associated test procedures relevant to industrial applications.

Having developed a good performance and easy to use handheld electrostatic fieldmeter we developed a number of associated applications. These took advantage of our expanding expertise in measuring electric fields:

- an electrostatic voltmeter (for zero current measurement of voltage),
- a Faraday Pail (for measurement of charge)
- a charge decay test unit (for assessing the suitability of materials and surfaces for avoiding electrostatic problems and for constructive applications).
- we also developed a lightning warning system (St Kilda and Benbecula).

The instruments for each of these measurements underwent several stages of enhancement during the life of JCI. This was helped by an early contract from BT for over 100 fieldmeter instruments.

We devised and developed, with SMART Award funding, a novel method for measuring the shielding performance of materials against transient electric fields. We successfully demonstrated a prototype system - but I then found there was no market interest! So work had to be discontinued.

No patents were taken out on the technical approaches we developed. Most of our technical approaches have been described in published papers. This provided protection against counter patents and was a good public demonstration and promotion of JCI technical capabilities. This seemed appropriate for the limited size of our market. To date, and as far as I know, no one has copied any of JCI technical approaches!

In 2008 it became clear that to continue manufacture of our JCI 155v5 charge decay test unit it would be necessary to move to a new microprocessor, as the one used would become unavailable. The design of a new enhanced version instrument was explored, but it became clear that the investment involved would require several years of continued business to pay for the investment. As most of us were at that time well over retirement age it seemed the right time to try to sell the business. Luckily a buyer was found and manufacture of JCI instruments has been able to continue.

6. MARKETING

Once JCI was set up I got an art designer I had used from my days in Bangor to prepare a company logo and get printed suitable business stationery. As soon as our first instrument was available a leaflet was prepared and printed and a press release sent to a number of suitable magazines. As further instrumentation was developed leaflets were prepared and press releases issued. These press releases generated a useful number of requests for information and purchase orders. In early days I visited a number of companies to demonstrate our instrumentation, but I cut this right back in later years as our reputation and our website information proved sufficient – and cut the costs and effort of visiting possible prospects.

From my time at Culham and at Bangor I had presented papers at conferences and summer schools, so I already had a public and professional image in electrostatics by the time I set up JCI. I pursued the public presentation of our works throughout my time with JCI as good promotion and as opportunity to keep in touch with developments and with market interests. This included travel to attend various international conferences and with writing of papers on investigatory studies pursued during instrument developments. I also had an involvement with some Standards committee work – which was frankly fairly frustrating (particularly from americans!).

As emailing and the internet became more available a JCI website was developed and progressively enhanced. This became the main route for promoting JCI instruments and capabilities and for communicating with contacts and customers. In time no leaflets were prepared for sending out to enquirers – they were referred to the website!

Much of the marketing was as ‘technical push’ rather than ‘market pull’ – i.e. advising prospective customers what would be appropriate for their interests, rather than asking them what they wanted!

7. FINANCE

The business did not make a profit for quite a few years. Operation was supported in early years by an increasing bank overdraft – established against the value of our house. A particularly low point was reached following the additional work after successful pursuit of our DTI SMART Award project. While the method subsequently showed promise for other applications I lost around £50k overall from this exercise – and this stretched the patience of the bank! After moving the debt from an overdraft to a mortgage on the house, finances did start to improve and eventually all debts were paid off and we were fully self-financing.

By having a good range of products that appealed to a variety of industries worldwide enabled us to keep monthly income reasonably stable - and without major peaks or troughs.

8. LESSONS FROM JCI EXPERIENCE

- 1) it is good to have both technical background and practical experience in making things as well as some experience in managing business operations. This enables one to appreciate and contribute to all aspects of business operations.
- 2) It is good to have breadth of background experience – in my case from the variety of work I had done. This included building radios and things at home and learning to use a treadle lathe during my schooldays
- 3) it is necessary to have an understanding bank manager to support early year losses. Avoidance of requirements of investor support makes management simpler
- 4) in a specialist area it is wise to concentrate on a limited and coherent range of own designed products and avoid ‘me too’ products
- 5) it is good to appeal to markets spanning a wide range of different industries. This diminishes the impact of ups and downs in individual areas.
- 6) it is necessary to check prospective market interest before proceeding too far with development of any new product
- 7) I think it is necessary to support manufacturing and marketing by continuous product development
- 8) in a specialist area of business it is necessary to build a good professional image by attending meetings and presenting papers. Doing consultancy and Standards work helps.
- 9) Basically the company is the people involved. So it is necessary to recognize their value and pay them consistently - even in times when you cannot pay yourself.
- 10) I feel my work experience has allowed me a good deal of freedom to make my own decisions and to express myself – so, only me to blame!
- 11) It is necessary to recognize the difficulty of selling a specialist business – do not expect to make lots of money!
- 12) in manufacturing the important thing is not just to appreciate the nature of a problem but to decide what you are going to do about it - and then live with the consequences of implementation! I feel that consultancy work benefits from such experience. Customers are not interested in the physics of a problem, but in what can be done, with confidence, to overcome it.

9. ACHIEVEMENTS

JCI achieved a reputation for good quality and high performance instrumentation. Particular features were:

- 1) development of high performance (high sensitivity, low noise and stable

zero) electrostatic 'field mill' fieldmeters which do not require earthing of the rotating chopper. This provided the basis for a compact handheld fieldmeter instrument and fieldmeters suitable for long-term continuous monitoring applications and for providing fast response times.

- 2) development of a fieldmeter suitable for long term continuous operation in adverse weather conditions with operational health facilities to confirm maintenance of full performance. This was included in the JCI lightning warning system.
- 3) development of instrumentation for charge decay measurement to assess the suitability of materials for avoiding risks and problems from static electricity - and for its constructive use.
- 4) demonstration of comparable charge decay performance between corona and tribo charging. This has shown that the corona charge decay instrumentation developed provides information that matches practical experience.
- 5) concept of 'capacitance loading' as an additional way to assess the electrostatic suitability of materials for avoiding the occurrence of high surface potentials from static charge retained on materials.
- 6) development of a new method to measure the shielding performance of materials. While this did not lead to a commercial instrument it seemed to have promise for assessing the risk of incendiary spark discharges to materials.
- 7) development of methods for formal calibration of instruments for a variety of electrostatic measurements.