

NEW ZEALAND NUFFIELD SCHOLARSHIP REPORT

Understanding the Drivers for Creation and Adoption of Innovation by Farmers; On and Off Farm

2013

SPONSOR PARTNERS

FMG
Advice & Insurance

beef+lamb
new zealand

DairyNZ

AGMARDT
THE AGRICULTURAL AND MARKETING
RESEARCH AND DEVELOPMENT TRUST



NUFFIELD
NEW ZEALAND

*Global Vision, Leadership
and innovation in Agriculture*

SUPPORTING SPONSORS



Mackenzie
Charitable
Foundation

Richard Fitzgerald - January 2013

TABLE OF CONTENTS

Table of Contents	1
Executive Summary	2
Introduction.....	4
Background.....	4
Method and Project Scope:.....	6
What is farm Innovation.....	7
Why Innovate?	7
The Innovation Ecosystem	8
An Enquiring Mind is the Foundation.	9
Innovation Adoption is a Complex	10
Reserve Value and Personal Drivers for Change	11
Innovation “Hot Spots”	17
Nurturing the Seeds of Innovation.....	18
Support for Innovation is Critical	18
How Does This Relate to New Zealand?.....	22
1- Invest in Young People - <i>they driver tomorrow’s economy and innovation.</i>	22
2 - Seek Behavioural Change - <i>position extension activities to generate behavioural change, not just knowledge transfer.</i>	23
3 - Incubate Innovation – <i>provide a structured process to explore and adopt innovation.</i>	24
Bibliography.....	25

EXECUTIVE SUMMARY

The ability of a business to compete in an ever changing world is linked into its ability to identify and adopt innovations. Introducing new ideas, alternate systems and different technologies enable a business to change and meet the market; it maintains competitiveness and relevance in an ever changing world.

A major challenge facing agriculture globally and within New Zealand, is the increasing more complex farm business environment. Price volatility, climate change and shifting societal expectations on food producers are bringing greater demands on the farmers of today, and those of tomorrow. The ability and willingness of farmers to explore new ideas and adopt innovation will play a significant factor in the success of farming in the future.

Identifying and adopting innovation is a complex and personal process, and improving our understanding of innovation adoption will aid in lifting the performance of farmers and farm business.

An individual's upbringing, their educational achievement and their participation in the world around them, establishes their willingness or openness to innovate. Whereas the adoption of that innovation is influenced by an individual's own aspirations and goals and under-pinning the personal driver, is the compulsion to improve an individual's place in life. Interacting with these personal drivers are external factors which also influence the willingness to innovate. These factors disrupt the status quo and bring about a change which requires a response from the individual.

An innovation needs a supportive environment to flourish. Leveraging off the personal drivers and factors increases the likelihood of the innovation to be adopted, and building a supportive environment increases prospect of the innovation becoming normalised into the business.

NZ's future agricultural success lies in a skilled workforce implementing innovation along the value chain. NZ agriculture needs a workforce that challenges the status quo and looks for creative solutions. Building these skills is the responsibility of all members of the agricultural industry. The industry must acknowledge the

importance of formal education and structured informal development, and build a culture of learning and discovery. This starts with our young people .

The willingness to innovate is the beginning of the innovation process, and the full value of the innovation needs to be demonstrated in technology transfer and the extension processes. Within these systems recognition of drivers other than financial drivers need to be accounted for, and innovation 'hot spots' identified.

NZ would do well to consider structured innovation development for farmers through processes like Innovation Incubators; structured creative exploration groups with supported discovery and implementation of innovation. Facilitated creative exploration within a supportive network would add significant value to the business of agriculture, and establish a blueprint for innovation discovery and adoption within the farm gate.

By building our people and equipping them for a changing world, NZ will be well positioned to capitalise on the challenges of the future. The heritage of resourcefulness and creative problem solving is embedded in the NZ farmer's psyche, and building skills and competencies to support this will strengthen our future and consolidate our position as producers of high quality, safe and secure food.

INTRODUCTION

The emerging challenge within New Zealand (NZ) agriculture is making the connection between innovation adoption and farm business success. The limiting factor in this process is not necessarily the availability of new ideas or new technology but rather the awareness and/or willingness of farmers to implement practice change. The challenge at industry level is how to unlock the potential of new technologies which will come as a result of unlocking the innovative spirit within our farming community.

BACKGROUND

New Zealand agriculture is well respected internationally. It is viewed favourably by other nationalities of farmers and their industry personnel, and is considered a very innovative and progressive industry (Alston & Butler, 2012). This position is generally considered to be a function of the Free-Market economic policy in which NZ agricultural business operates (Horner, 2012).

Any amount of time spent with farmers from other countries will demonstrate a wide difference of attitudes toward farming and agribusiness when compared to New Zealand farmers. Generally speaking, there is a strong focus amongst other nationalities on the political environment in which their farm businesses operate. This is largely driven by the significant portion of their income which is derived from subsidy schemes (or versions thereof) and the associated compliance activities. The political environment has a significant impact on farm profitability, productivity and processes which can be implemented within the business (Piggot, 2012).

The presence of the various subsidy schemes appears to have had an impact on farmer attitudes and behaviour in relation to their own business



FIGURE 1- VALUECAN BE ADDED TO FARM PRODUCTS THROUGH INNOVATION - CANADIAN SHEEP AND BUFFALO CHEESE FACTORY

practice, their business model, their attitudes toward government assistance and their expectations of government intervention when business conditions are difficult. In general terms there is a conservative perception of risk and more prevalent conservative attitudes towards the uptake of new ideas by farmers' on-farm (Clarke, 2012) (Greener, 2012) (Pearson, 2012).



FIGURE 2- FARMERS MARKETS PROVIDE NEW OPPORTUNITIES TO DIVERSIFY AND ADD VALUE TO PRODUCE- MARIN FARMERS MARKET, SAN FRANCISCO.

Further exploration of the link between subsidy schemes and farmer behavioural responses indicate that the presence of subsidy schemes and lower rates of innovation adoption are correlated but are not causal. Consultation with EU, Canadian and US based agriculturalists all agree that subsidy schemes reduce the likelihood of farmers to take on risk as they have less incentive to 'push the boundaries' or adopt new ideas or technologies. In other words their business environment becomes "comfortable" and "complacency" can set in (Starbird & Parker, 2012) (Alston & Butler, 2012) (Martin, 2012) (Knipe, 2012), (Greener, 2012), (Clarke, 2012) .

It stands to reason that if there is a negative impact of external factors such as financial assistance, and farmer adoption of innovation, so too is there potential for identifying positive drivers which enhance the farmer uptake of innovation.

Can we enhance innovation adoption? The research topic for this thesis is:

UNDERSTANDING THE DRIVERS FOR THE CREATION AND ADOPTION OF INNOVATION BY FARMERS; ON AND OFF FARM.

A better understanding of the positive drivers for innovation adoption will enhance the on-going improvement of the NZ agricultural industry by broadening the farmer base of those trying new innovation, and increasing the rate of adoption of new ideas, technologies and farm management practices.

METHOD AND PROJECT SCOPE:

This report has been prepared for the completion of the New Zealand Nuffield Scholarship – 2012. The observations and recommendations within this report are provided as a commentary on the topic which is based on twenty weeks of international travel (over three time periods) through fourteen countries – Australia, Philippines, China, Hong Kong, USA, Canada, Belgium, France, Italy, England, Wales, Scotland, Ireland and New Zealand. The commentary is the result of over sixty meetings specifically focussed on this topic and included numerous visits with University Professors within the Innovation area (Canada, USA), industry professionals (UK, Canada, USA, Philippines, Australia, Ireland), government agencies (USA, Canada, UK), policy makers (USA, EU, Australia), government politicians (Australia, USA, EU), and farmers (Australia, China, USA, Canada, Belgium, Wales, England, Scotland, Ireland).

The meetings were undertaken as an interview with several core questions and supplementary questions, as the opportunity arose. As recommended by the international contacts, further reading was undertaken with scientific papers, articles, books and recommended publications.

Innovation adoption is strongly linked to attitudes toward risk which are rooted in both the Nurture (being the external environment such as upbringing) and Nature (being inherent and inbuilt such as genetic disposition) influences. This report focusses on the Nurture side of the Nurture/Nature equation, with consideration for the Nurture part which can be influenced by the agricultural industry intervention. In other words this report explores Innovation adoption drivers from secondary school aged onwards.



FIGURE 3- IN CALIFORNIA, A DAIRY FARMER IS PRODUCING METHAN GAS FROM EFFLUENT AND SELLING ELECTRICITY TO THE GRID

WHAT IS FARM INNOVATION

Farm innovation is the introduction of any new or significantly improved technologies or management practices. These include new products, processes, and organisational or marketing systems that have not previously been used on farm, although they might not be new to the sector or to the world (Schrumpter, 1942).

WHY INNOVATE?

The challenges of farming within a subsidised economy contrasts sharply with NZ (and Australian) agriculture where negligible subsidy support exists. Australasian farmers have developed various business models to manage the prevalent business risk which generally has created openness amongst farmers' to new ideas and innovation. The challenge and opportunity facing farmers is that within the increasingly more complex business environment, integrating new ideas is critical. Simply doing more of what we have achieved previously will not secure our future. Our future success is dependent on adopting new technologies, practices, systems and equipment – Adopting Innovation. Our success in the future is dependent on our ability to identify, develop and adopt innovation on-farm and along the value chain.

New Zealand has a heritage of innovation. The 'Number 8 Wire' mentality is a cornerstone of NZ's success and is a reflection of a positive attitude towards innovation. It is about looking at alternative uses of existing resources and the application of new ideas to an existing situation. In the business world, adopting new ideas and technology is the way businesses change to meet the constantly evolving business environment. The rate and



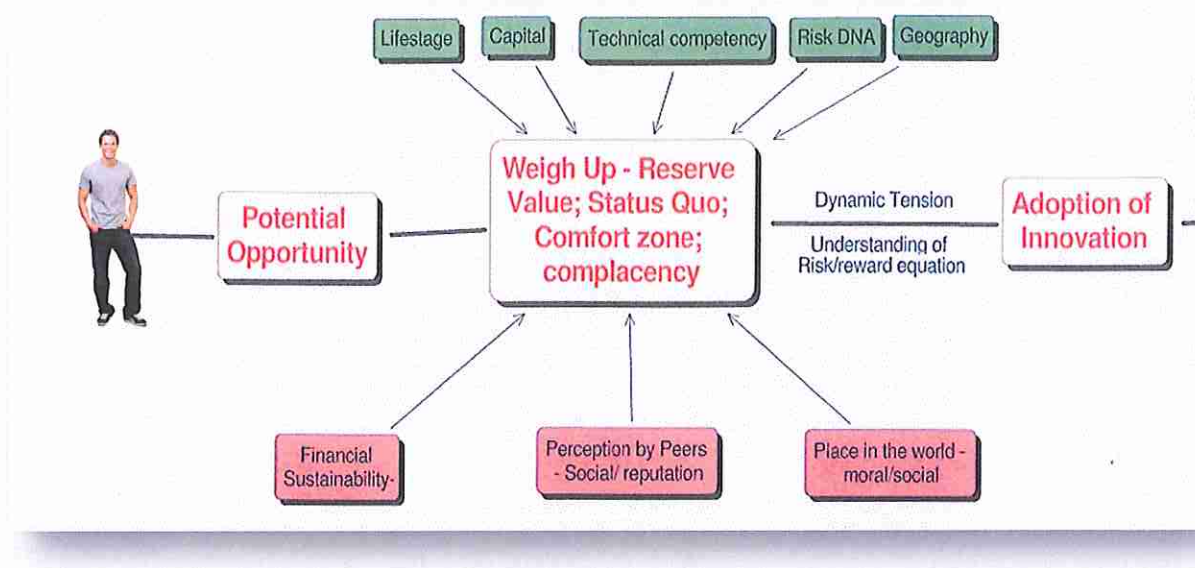
FIGURE 4 - OPPORTUNITIES ARE AVAILABLE TO MARKET THROUGH DIFFERENT CHANNELS WITH DIFFERENT STRUCTURES, SOME OF WHICH, FARMERS CAN OWN PARTS OF THEIR VALUE CHAIN - FLORA-HOLLANDA THE WORLD'S LARGEST FLOWER COOPERATIVE & FARMER OWNED

extent of innovation adoption by farmers is a core driver of productivity growth and key farm performance indicators (Lim & Nossal, 2011). It is the means by which productivity can be maintained or enhanced, the way that farm practices can change to meet environmental or societal expectations, the way that new challenges can be surpassed or on which whole new business models are based.

THE INNOVATION ECOSYSTEM

The process of adopting a new idea or practice has three major parts to it, and therefore three areas which can be enhanced through industry intervention.

- The first part is the individuals' openness to consider innovation and the triggers for them to look for a better position in life.
- The second part is the influences upon an individual both internally and externally, which enhance or constrain the decision to innovate.
- The third part is the social and business environment which supports the innovation to take hold, and provide the optimum value back to the individual.



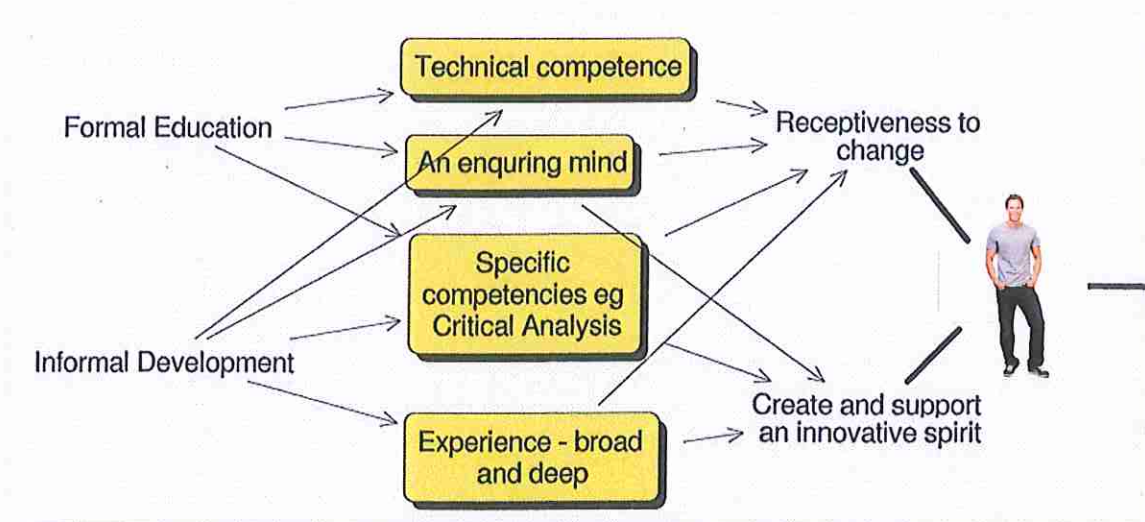
THE INNOVATION ECOSYSTEM

AN ENQUIRING MIND IS THE FOUNDATION.

The most difficult question which remained unanswered from the research (and awaits a Nobel Prize for the person who answers it) is “what makes one farmer willing to innovate while others in the same physical, social and business environment do not innovate” (Alston & Butler, 2012).

What differentiates one person from another is not clearly understood however, it is agreed that formal education and structured informal development play a critical foundational role in the willingness to consider innovation (Knipe, 2012), (Martin, 2012). They both perform a role in developing an individual's core skills from which ones' awareness of their ability to challenge the status quo, and seek out solutions is based.

Both development pathways grow important competencies like Critical Analysis and they build Technical Capability. They also provide a wider breadth of life-experience giving a world view that tends to be richer and deeper than those without formal education or informal experience. An enquiring mind with a wide world view provides a more fertile environment for challenging the status quo and seeking creative solutions (Knipe, 2012) (Martin, 2012).



THE INNOVATION ECOSYSTEM 1- FORMAL EDUCATION & STRUCTURED INFORMAL DEVELOPMENT

The interaction between formal education and informal development is not explicitly understood. Anecdotal evidence points to a complementarity between formal education and informal development to create a multiplying effect on individuals' personal skills (when compared to each process occurring in isolation). Formal education provides knowledge with review/analysis skills (along with general life experiences



FIGURE 5 - NEW SEED VARIETIES AND GMO CROPS OFFER NEW OPPORTUNITIES TO MAINTAIN PRODUCTIVITY WITH REDUCED INPUTS - INTERNATIONAL RICE RESEARCH INSTITUTE: PHILIPPINES

that accompany student life) while informal development tests these skills in a real world environment and embeds academic concepts into applied ability.

There are currently relatively low levels of academic achievement amongst the NZ rural population and low levels of engagement in structured informal development. This is a significant risk for NZ agriculture. If education and informal development are the precursor to innovativeness and our future success is based on innovation adoption, work is urgently needed to engage with farmers educationally and within structured informal development initiatives such as personal development programmes and network organisations.

The traditional view of a farmer tending their land and happy in their own undisturbed world will not position NZ agriculture well for the future. Young people particularly, need to be challenged and extended beyond their comfort zones. They need to be encouraged to pursue further learning and participate in a range of on and off farm interests. They need to have their world view challenged and their thinking extended beyond the world before them.

INNOVATION ADOPTION IS A COMPLEX

At an individual level, the decision to consider and adopt a new approach to any business practice is a complex affair. A state of mental dynamic tension within a farm businessman's mind exists because of the constant ebb and flow of emotion as

the farmer weighs up new opportunities against the perceived risk. Yet, farmers are unlikely to innovate without some pay off (Lim & Nossal, 2011).

Innovation brings uncertainty, it contains incomplete knowledge and is accompanied by a level of anxiety that typically takes someone outside their comfort zone and involves decision making in an unfamiliar state of mind. For some it is an uncomfortable position and readily avoided, while for others it is exhilarating and they are drawn to the excitement. Most people sit somewhere between these two places.

RESERVE VALUE AND PERSONAL DRIVERS FOR CHANGE

Risk is balanced against the perceived reward (Hutchinson, 2012). An innovation may bring a singular benefit, or an array of opportunities which the farmer sees as valuable and worthwhile in the light of the risk. When the rewards outweigh the risk, innovation is adopted. This is where the concept of “Reserve Value” makes its debut.

“RESERVE VALUE” IS A VALUE WHICH IS ASSIGNED BY AN INDIVIDUAL FOR THE STATUS QUO OF A SITUATION, AND CHANGE WILL NOT OCCUR UNTIL A SUBCONSCIOUS THRESHOLD IS EXCEEDED.

In the mind of the farm businessman, a “Reserve Value” is assigned to the status quo of an opportunity. The farmer knows the variables of their current existence such as risk, convenience/inconvenience, satisfaction and fulfilment, so the new innovation must provide for a better position than their current status i.e. less risk, greater satisfaction or improved convenience. (Gow, 2012) When the new opportunity offers a more attractive position than the status quo, a tension arises which will lead to a change in



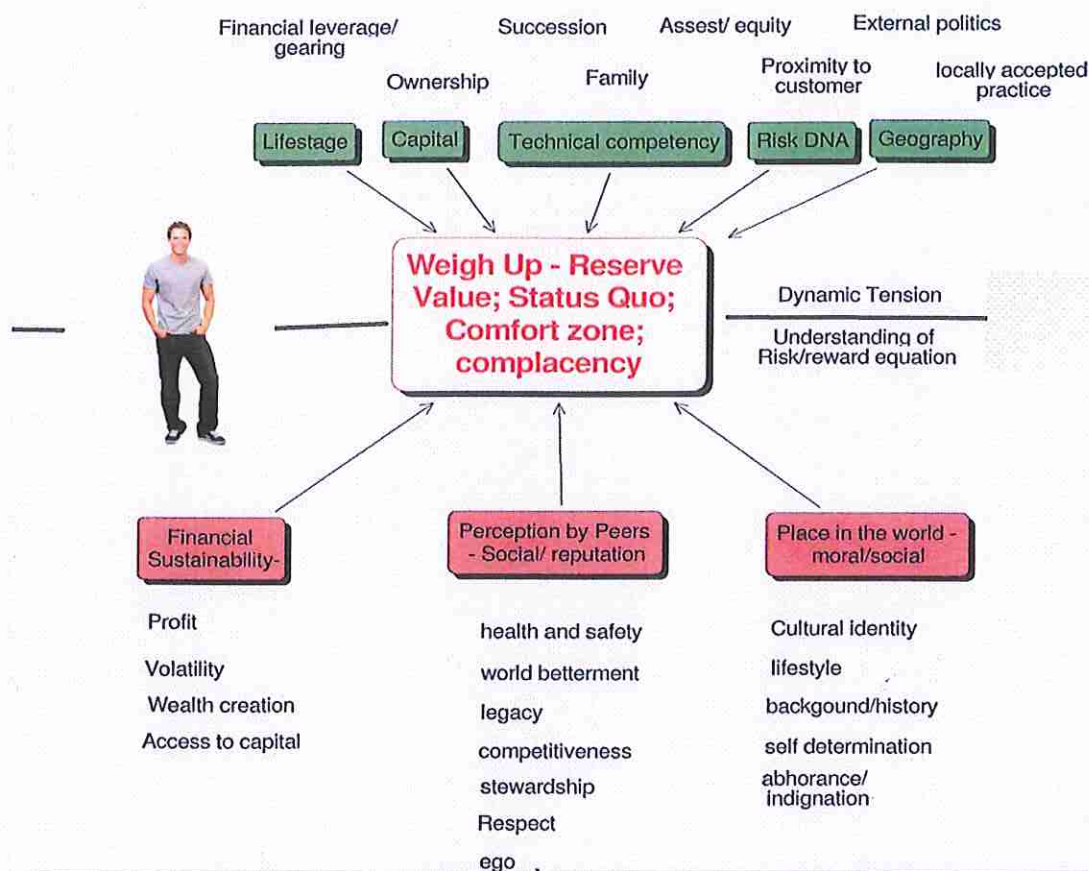
FIGURE 6 - BIODIVERSITY IN HEDGE ROWS TAKE A MORE HOLISTIC APPROACH TO FARMING THROUGH INTERACTIONS BETWEEN PARASITIC HOSTS AND OVERWINTERING PLANTS - MODEL FARM BELGIUM

behaviour? If the Reserve Value is exceeded in a farmer's mind the result will ultimately lead to action and the likely adoption of innovation.

The "Reserve Value" is not an easily quantified figure but rather a combination of many different personal drivers which contribute to a 'hunch' or 'gut feeling' about the opportunity. Some personal drivers can be quantified such as the financial drivers, while others are more subtle and discrete. Financial drivers are often the obvious ones to consider however, there are many other drivers which sit at different levels within the person's mind, and collectively equate to the Reserve Value.

PERSONAL DRIVERS

The Personal Drivers are rooted in the personal desire to attain a better position in life and an enhanced view of ones-self. (There has been much work done on this area and this report will not explore this aspect of innovation adoption any further).



THE INNOVATION ECOSYSTEM 2 -PERSONAL DRIVERS AND INNOVATION ADOPTION FACTORS

The Personal Drivers for adopting innovation can be classified into three main categories:

1. Providing for Greater Financial Sustainability
2. Enhanced Perception by Peers
3. Affirming Your Place in the World

Each of these categories is comprised of several drivers which have varying degrees of influence, depending upon the situation and prospective innovation. Each individual will place more or less emphasis on the various personal drivers, and for some, a number of the personal drivers will not have any influence what-so-ever (Alston & Butler, 2012), (Horner, 2012), (Starbird & Parker, 2012) (Ellinger, 2012), (Martin, 2012), (Lim & Nossal, 2011).

FINANCIAL SUSTAINABILITY:

- Profit – innovation that will enhance the profitability of the business.
- Volatility – innovation that will reduce the variation of income or expenses to reduce the volatility of the profit margin.
- Wealth Creation – innovation that will add to the total wealth of the business.
- Access to capital – innovation that will position the business for easier access capital.

PERCEPTION BY PEERS (ALSO COULD BE CALLED REPUTATIONAL DRIVER)

- World betterment – innovation that improves the 'world' and makes it a better place to be, as the individual sees it.
- Legacy – innovation that will establish/build a positive association for the individual to be remembered by.



FIGURE 7 - MILK PRODUCTION IN CHINA FOCUSES ON FRESH MILK FOR THE TOP END OF THE MARKET IN HIGH QUALITY PACKAGING

- Stewardship – innovation that enables the businessman to be a better manager and steward of the resources they control.
- Health and Safety - innovation that will make the business a safer and more attractive place of work for staff.
- Respect – innovation that will build the 'Mana' of the individual amongst their peers; enhancing the respect others have for the individual.
- Competitiveness – innovation that will give the businessman the edge over their colleagues who they respect.
- Ego – innovation which will satisfy an individual's vanity and how others view the businessman; according to the individual

PLACE IN THE WORLD (OR COULD BE CALLED THE MORAL AND SOCIAL DRIVER)

- Cultural identity – innovation which will support or enhance an identity that is derived from ones culture.
- Lifestyle – innovation which supports or enhances the lifestyle choices of an individual.
- Background/history – innovation which consolidates an individual's identity from their younger years or generations before.
- Self Determination – innovation which provides an individual with the ability to self-govern and maintain a social identity.
- Abhorrence/ indignation – innovation which empowers an individual to respond an unacceptable social or business environment.

The Personal Drivers operate at a subconscious level within the businessman's mind and influence the individual to varying degrees. It is a dynamic process and changes on a day to day basis. The prominence of the Personal Drivers is also amplified or reduced according a number of larger influencing factors which have been termed - Innovation Adoption Factors.

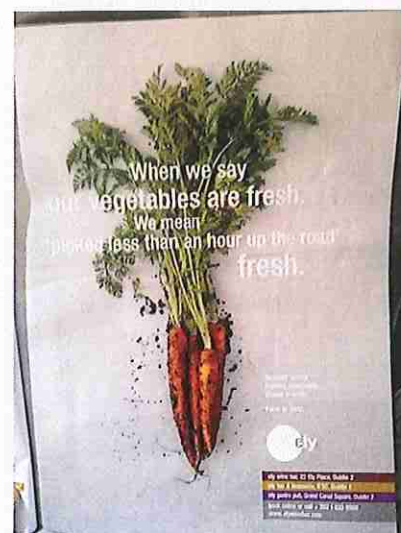


FIGURE 8 - CONSUMERS WANT TO KNOW WHERE THEIR FOOD IS COMING FROM AND HOW IT IS GROWN, CREATING NEW OPPORTUNITIES FOR NICHE MARKETING - ONTARIO, CANADA

INNOVATION ADOPTION FACTORS

Innovation Adoption Factors are major influences on the individual's willingness to innovate, and they overshadow the Personal Drivers. They are predominantly externally based and while they don't determine whether an innovation is adopted, they provide background 'noise' in the adoption psyche and can reduce or enhance the farmers' openness to change.

Five Innovation Adoption Factors have been identified and these are:

- 1) Life-stage.
- 2) Capital base.
- 3) Technical competency.
- 4) Risk DNA.
- 5) Geography.

LIFESTAGE – FAMILY, OWNERSHIP, SUCCESSION

The influence of Life-stage ebbs and flows around various life events, such as emerging adulthood, the onset of a family, financial consolidation, business ownership, retirement and succession (Horner, 2012). They all influence the willingness of an individual to innovate or change their business practices. For example, younger individuals tend to be more willing to take on risk, are more willing to try new ideas and are more willing to embark on a venture with incomplete knowledge (This is not hard and fast but is generally the case). The reasons for this are not simple and include reasons such as naivety, youthful energy, availability of time to rebuild unsuccessful ventures, unconstrained by history or past failures, and familiarity with emerging technology. At the other end of the spectrum, retirement and the succession process can be strong catalysts for change also as solutions are sought for imminent change.



FIGURE 9 - DEVELOPING SUPPORT PROCESSES AROUND PRODUCTION SYSTEMS SUCH AS INNOVATIVE EQUIPMENT CAN ADDVALUE TO THE BUSINESS - BIODGRADABLE PLASTIC IN IRELAND

A disruption to the status quo is the catalyst for change and action is required to readjust to the new reality. Changes will alter the risk profile and for some it can be insignificant and pass un-noticed, while for others it can be hugely disruptive and traumatic.

CAPITAL BASE – ASSET/EQUITY, FINANCIAL LEVERAGE & GEARING.

The availability of capital is a strong driver for innovation adoption and there are two camps within this Innovation Adoption Factor. The first one is having the capacity within the business to absorb losses from ventures which go badly without it destroying the business. This approach tends to occur within established business who can experiment with new ideas without jeopardising the whole business. The second view is being young enough and with sufficient capital to take risks and has time to recover from unsuccessful ventures (Ellinger, 2012). This behaviour appears in the IT world where young people develop technology innovations and the failure rate is high. They work through the disappointment and then take on the next project.

TECHNICAL COMPETENCY – KNOWLEDGE, SKILLS.

Innovation tends to occur more so with individuals who have a good level of technical ability within their business (Ellinger, 2012) . The pursuit of new ideas comes at the edge of knowledge and those who have a higher level of technical ability will see opportunities more readily and identify potential solutions. Those individuals will be conversant with existing knowledge and able to challenge the status quo while looking for new answers.

RISK DNA: RISK AVERSION & PROPENSITY FOR RISK.

There has been much research into attitudes toward risk and risk aversion and this report will not explore that topic any further. Other



FIGURE 10- SOME COMMUNITIES ARE COMMITTED TO MAINTAINING AN IDENTITY AND RESIST TECHNOLOGICAL DEVELOPMENTS - MENNONITE COMMUNITIES IN USA AND CANADA

than to say that aversion to risk and propensity to risk can both reduce innovation adoption and/or enhance innovation adoption, depending on the interaction with the individual's Personal Drivers (Alston & Butler, 2012). A person who is very risk averse may well consider an innovation because it may reduce their perceived risk. Equally someone who has a high propensity for risk is more likely to experiment and try new innovations.

GEOGRAPHY – PROXIMITY TO MARKETS, LOCALLY ACCEPTED PRACTICE.

The physical location of an individual farmer has an influence on their willingness to adopt innovation. Some farming areas have a prevailing conservatism associated with the area and innovation can be discrete. This may be due to a response to climatic or market risk or may be a historical or cultural influence. None the less, adoption of new innovation in these areas tends to be reduced when compared to other regions or catchments. Conversely, other areas provide opportunities which reward so-called risky and innovative behaviour and attract progressive businessmen (Ellinger, 2012). Like minded operators can congregate in the same location and provide for a prevailing innovative mind-set. The South Bay area of Northern California known as Silicon Valley is a good example of an innovation hub (Gloy, 2012), while the Amish and Mennonite communities of US and Canada demonstrate low levels of innovation through a community culture of conservatism.

INNOVATION “HOT SPOTS”.

Anecdotally, there appears to be ‘hot spots’ of increased likelihood of innovation where certain Personal Drivers and Innovation Adoption Factors converge. The opportunity exists to formally research their interaction to gain a better understanding of the linkages. This knowledge can be used to influence the design of industry initiatives to better support innovation adoption by farmers.



FIGURE 11 - THE MARKET WILL DRIVE INNOVATION PARTICULARLY WITH INCREASED AWARENESS OF FOOD SAFETY AND FOOD SECURITY - GUANGHOU CHINA

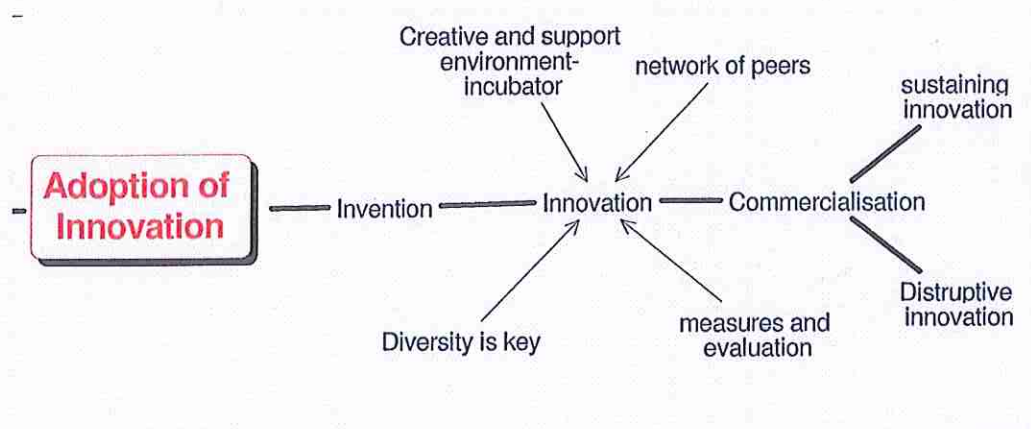
NURTURING THE SEEDS OF INNOVATION

The innovation needs a supportive environment to take hold and grow. In a way similar to a seedling plant which germinates and grows, so too must the innovation. The business environment which surrounds the innovation will challenge, test, undermine and buffet the innovation in the same way that a natural environment will send parching winds, drought, heavy rain and frosts to challenge the growing seedling. The support that is provided is critical to the success of the innovation, just as it is for the seedling.

Many innovations are small, the changes incremental and they build on existing knowledge and practices. These are called sustaining innovation (Bholje, 2012). An example of this is the improvement to the plough which has changed dramatically over the centuries, but in small steps. Other changes require a whole new approach and need different systems and support mechanisms that didn't exist prior to the introduction of the innovation. These are called disruptive innovation. An example of this is precision agriculture and GPS controlled equipment such as tractors and sprayers.

SUPPORT FOR INNOVATION IS CRITICAL

Whether the innovation is incremental or disruptive, a supportive environment is crucial (Bholje, 2012). A supportive environment a number of crucial conditions for inception, implementation and growth of innovation.



THE INNOVATION ECOSYSTEM 3 - A SUPPORTIVE ENVIRONMENT

These conditions are:

1. Group Discovery
2. Diversity
3. Creativity
4. Trust
5. Belief
6. Measurements and Evaluation

1. GROUP DISCOVERY.

Group discovery plays a critical role in innovation adoption. A group of individuals with a common purpose potentially provides depth, breadth and width of experience; but this does not automatically translate into an effective stimulus for innovation (Ellinger, 2012) (Knipe, 2012), (Hutchinson, 2012).

Working with a motivated likeminded (but not homogenous) group will provide stimulus and debate. It will challenge existing perspectives and seed un-thought-of ideas. The group discovery process provides the opportunity to explore new and radical ideas which can be nurtured within the safety of the group.

2. DIVERSITY.

The group dynamic will provide greater value with greater diversity. In an agricultural setting this includes participation of individuals outside the specific sector (Hutchinson, 2012). Just as at an individual level, a wide world-view (through the collective) will provide a wider range of knowledge and experience to test against and to draw upon.



THE INNOVATION ECOSYSTEM 4 -
BUY LOCAL IS A WORLDWIDE
TREND AND PROVIDES
OPPORTUNITY FOR PRODUCERS
TO ADAPT TO EMERGING
MARKET OPPORTUNITIES -
PORTLAND FARMERS MARKET:
USA

3. CREATIVITY.

Creative thinking is the cornerstone of innovation. Imaging what can be is not easy, and group facilitated creative sessions can provide for greater creativity. This process is common within corporate Innovation Incubators and could be adopted for farmer group applications (Hutchinson, 2012).

4. TRUST.

The process of Innovation Adoption is aligned with risk taking. With risk taking comes a very real prospect of failure, so the group dynamic must allow for failure without judgement (Estrin, 2009).

5. BELIEF.

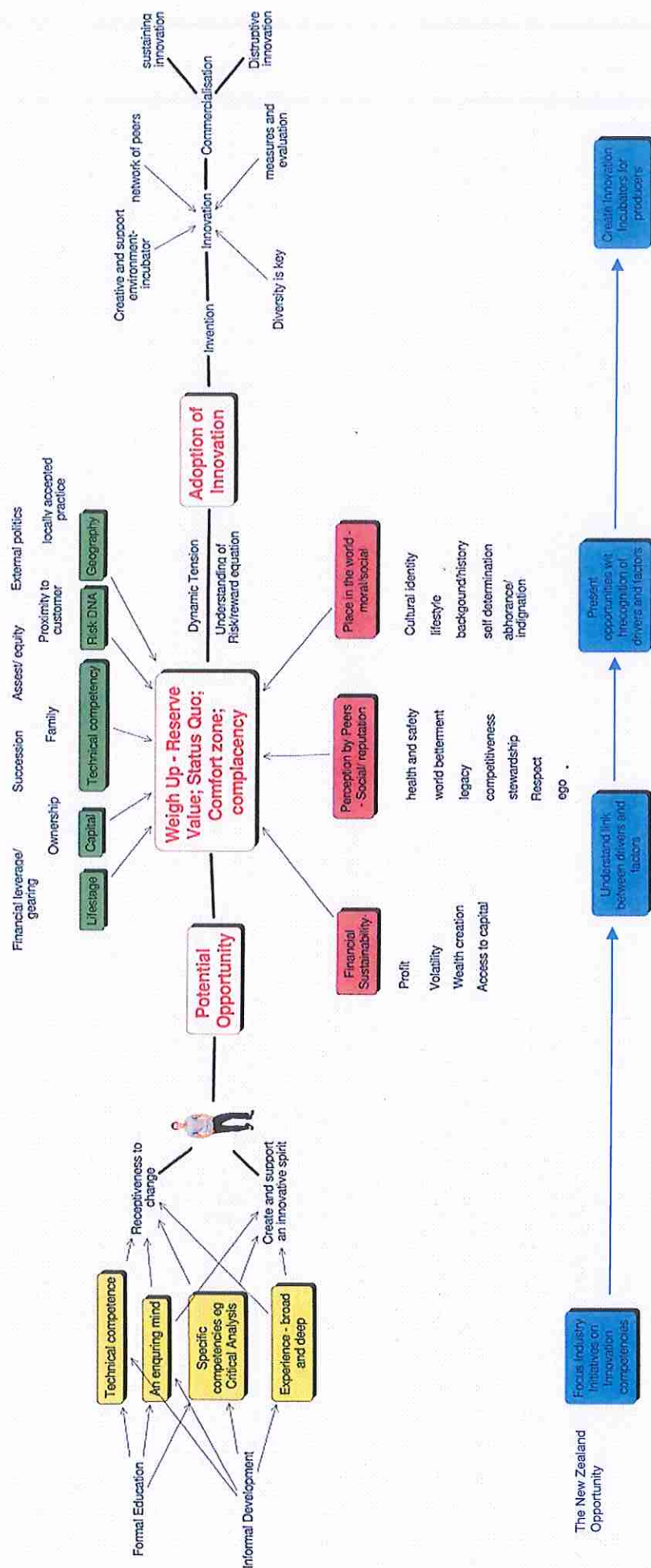
Linked to trust, is the belief that success is possible. This can come from those in the support position as often those at the front line of innovation rely on the support of others in the group (Estrin, 2009).

6. MEASUREMENT AND EVALUATION.

A well designed group will be focussed and motivated. This will, by virtue of the nature of the group, draw a singularity of vision that will seek ways and means of evaluating progress and success. These measures are critical as the feedback mechanism for success and fulfilment for the group (Bholje, 2012).

Many existing NZ extension initiatives aim to provide a positive environment for new innovations to take hold. They achieve this by providing information, examples and role models. Within NZ, the main extension activities revolve around field days, field trials, example farms, newsletters and one on one consultation. They are virtually all exclusively sector based with a high degree of homogeneity with the attendees.

THE INNOVATION ECOSYSTEM 5- OPPORTUNITY FOR NZ TO RESPOND TO THE INNOVATION



HOW DOES THIS RELATE TO NEW ZEALAND?

To date, New Zealand's has performed generally satisfactorily in productivity and profitability stakes over the past few decades. The world is changing and the skills that drove agriculture forward then, are now essentially the basic skills that will be necessary to run businesses adequately in the future; as farmers naturally up-skill, the bar is raised. The future demands on farmers require a whole set of new skills that are now emerging, as well as the ones previously considered sufficient. Farmers need to be much more sophisticated businessmen and demonstrate good knowledge and ability in areas such as human resource management, environmental management, marketing, governance and information management. This requires behavioural change from farmers and a new approach from industry.

Most NZ extension activities function as knowledge transfer, not necessarily to achieve behavioural change. New initiatives within NZ are focussing on developing the individual and in some respects; this research validates the approach being undertaken. The research has also identifies three recommendations for NZ agricultural industry groups and are aligned to each of the three parts of the Innovation Ecosystem:

1- INVEST IN YOUNG PEOPLE - THEY DRIVER TOMORROW'S ECONOMY AND INNOVATION.

- a. Industry wide - Farmers, industry organisations and all agribusiness - should engage with young entrants to the agricultural industry and recognise that this has a long pay-back period. The investment in young people through formal education and engagement in structured informal development provides the foundation for innovation adoption and cannot be undervalued. Arguably the human capital issues facing NZ agriculture today are a legacy of the deregulation of two decades ago with the decline of organisations like Young Farmers and low student graduate numbers. A key function of the engagement with young people is about extending their world view so activities such as competitions and network interaction should be core

activities on their calendars. The process should generate action and require participation, not be a passive process.

- b. All industry organisations, agribusiness and farmers should be requiring formal learning for their young staff and in encouraging participation in structured informal development. It should be expected normal behaviour built into the employment agreement.
- c. Structured informal development should be positioned to challenge young peoples' world view and seek to extend their range of life experiences. Organisations such as Young Farmers should design their initiatives to extend people comfort zones and have them participate in new experiences outside the world of agriculture.
- d. Capability development programmes should have a tighter focus on innovation competencies such as Critical Analysis within their development programmes. This should also not remain the role of youth based informal development initiatives only, but should occur across the full range of development programmes.

2 - SEEK BEHAVIOURAL CHANGE - POSITION EXTENSION ACTIVITIES TO GENERATE BEHAVIOURAL CHANGE, NOT JUST KNOWLEDGE TRANSFER.

- a. Industry should undertake formal research to better understand the linkages between Personal Drivers and Innovation Adoption Factors so that innovation 'hot spots' can be utilised and openness to change supported.
- B. Industry should re-design the way new ideas, techniques and technology are presented to prospective consumers. Recognition of other drivers beyond financial benefits needs to be identified and built into the marketing process. A more holistic approach should be undertaken to demonstrate the full value of an innovation and acknowledge that there are many influences on the decision of whether to innovate or not.

3- **INCUBATE INNOVATION** – *PROVIDE A STRUCTURED PROCESS TO EXPLORE AND ADOPT INNOVATION.*

- a. Industry should develop a structured approach to exploring and implementing innovation through a formally developed process. There are a number of well-established Innovation Incubators operating in the USA, however all that were encountered were located beyond the farm gate and aligned with corporate agribusiness. There exists an opportunity to apply the same principals to a farmer based Innovation Incubator which should be delivered through an established nationwide business network.
- b. Pilot work in the Rural Business Network has demonstrated a demand for a structured network exploring higher level business management. An Innovation Incubator programme could operate within this network with interested parties. This would provide a cross section of people with a pan industry focus and who are vertically integrated. Discussion with US based industry personnel generated interest in this concept (Hutchinson, 2012).
- c. An Innovation Incubator programme could be established at a Regional level utilising local resources and talent, and explore solutions to regionally based challenges. It could be facilitated at a national level with the development of a framework and an annual National Innovation Conference.

BIBLIOGRAPHY

- Alston, J., & Butler, B. (2012, October 18th). What are Innovation Adoption Drivers. (R. Fitzgerald, Interviewer)
- Bholje, M. (2012, October 29th). Education and Innovation. (R. Fitzgerald, Interviewer)
- Black, R. (2012, November 1). Informal Development and Innovation. (R. Fitzgerald, Interviewer)
- Brookes, H. (2012, March 9th). CPD deveopment of UK farmers. (R. Fitzgerald, Interviewer)
- Clarke, D. (2012, March 17th). The Red Tractor and behavioural change with farmers. (R. Fitzgerald, Interviewer)
- Contrell, R. (2012, October 22nd). Rural Sociology and Innovation. (R. Fitzgerald, Interviewer)
- Ellinger, P. (2012, October 26th). What are the Drivers of innnovation Adoption. (R. Fitzgerald, Interviewer)
- Estrin, J. (2009). *Closing the Innovation Gap*. New York: McGraw Hill.
- Franklin, D. J. (2012). *2050 MegaChange; The World in 2050*. London: The Economist.
- Gloy, B. (2012, October 27th). Innovation Adoption. (R. Fitzgerald, Interviewer)
- Goss, V. (2012, June 1st). Australian Rural R&D Corporations. (N. A. NZ, Interviewer)
- Gow, H. (2012, September 10th). Innovation. (F. R, Interviewer)
- Greener, C. (2012, March 8th). Linkages between subsidies and farm performance . (R. Fitzgerald, Interviewer)
- Hauser, B. (2012, October 25th). What are the Characteristics of an Innovator. (R. Fitzgerald, Interviewer)
- Horner, J. (2012, October 22nd). What are the Drivers for Innovation adoption. (F. R, Interviewer)
- Hutchinson, M. (2012, October 22nd). Innovation incubators . (R. Fitzgerald, Interviewer)
- Knipe, R. a. (2012, October 27th). Innovation Adoption. (R. Fitzgerald, Interviewer)
- Lim, K., & Nossal, K. (2011). *Innovation and Productivity in the Australian Grains Industry*. Canberra: ABARES Research Report.
- Martin, L. (2012, November 1st). Innovation and Education. (R. Fitzgerald, Interviewer)
- Parcell, J. (2012, October 25th). Innovation Adoption and Arable Agriculture. (R. Fitzgerald, Interviewer)
- Pearson, N. (2012, March 9th). National Farmers Union and farmer innovation . (R. Fitzgerald, Interviewer)
- Piggot, I. (2012, March 16th). Subsidies and UK Famring. (R. Fitzgerald, Interviewer)
- Schlosser. (2002). *Fast Food Nation*. New York: Harper Collins.

- Schrumpster, J. (1942). *Capitalism, Socialism and Democracy*. New York: Harper, .
- Snijders, H. (2012, February 28th). The Common Agricultural Policy. (N. I. 2012, Interviewer)
- Sonka, S. (2012, October 27th). Mental maps and Innovation. (R. Fitzgerald, Interviewer)
- Starbird, D., & Parker, G. (2012, October 17th). What are the drivers for Innovation Adoption. (F. R, Interviewer)
- Van Dijk, G. (2012, March 3rd). Cooperative Business in Holland. (N. I. 2012, Interviewer)
- Ward, J. (2012, March 16th). Professional Development of Farmers through the NOROSO programme. (R. Fitzgerald, Interviewer)
- Yonsen, P. (2012, February 28th). Vion Food Group. (N. International, Interviewer)
- Young, L. (2012, March 13). Farmer attitudes to subsidies. (R. Fitzgerald, Interviewer)